



AGRICULTURAL RESEARCH INSTITUTE

PUSA

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE

313064



IARI



XXXIth Year — Nos. 7 & 8 — July & August 1940

ROME

VILLA UMBERTO I

1940

The reproduction either in whole or in part of material printed in the Review is permitted, but only on the express condition that the source is duly acknowledged as follows: *International Review of Agriculture (International Institute of Agriculture)*.

CONTENTS

AGRICULTURAL ECONOMICS AND SOCIOLOGY (249 E-292 E)

CHANGES IN THE PROFITABILITY OF AGRICULTURE IN SOME EUROPEAN COUNTRIES IN 1935-36 AND 1936-37 249 E

CROP INSURANCE 271 E

INTERNATIONAL CHRONICLE OF AGRICULTURE:

Bulgaria 276 E
Brazil 283 E

BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS 291 E

AGRICULTURAL STATISTICS (449 S-552 S)

VEGETAL PRODUCTION.

Articles and summaries.

The Prospects of the 1940

Wheat Crop 449, 485 S

The Sugar-Beet Crop in Europe and Sugar Production 461, 498 S

Information by countries.

Cereals 452, 489 S
Maize 459, 493 S
Rice 460, 497 S
Potatoes 460, 497 S
Sugar 464, 499 S
Vines 465, 502 S
Olives 465, 503 S
Flax 466, 503 S
Cotton 467, 504 S
Hemp 468, 505 S
Tobacco 468, 506 S
Hops 469, 507 S

Other Products (Cacao, Coffee, Groundnuts, Colza and Sesame) 469, 507 S

Fodder Crops 470, 509 S

Latest informations 552 S

LIVESTOCK AND DERIVATIVES.

Articles and summaries.

World trade in Eggs in the shell in the last ten years . . . 517 S

Information by countries.

Pig population in Denmark . . . 511 S
Livestock in Hungary . . . 512 S
Livestock in Lithuania . . . 513 S
Livestock in Switzerland . . . 513 S
Poultry-farming in Switzerland 516 S
Current information on livestock and derivatives . . . 539 S
Sericulture 472, 539 S

| | | | |
|---------------------------------|------------|-------------------------------------|------------|
| TRADE. | | Cacao | 476, 543 S |
| Wheat | 473, 540 S | Tea | 476, 543 S |
| Wheat flour | 473, 540 S | Coffee | 476, 543 S |
| Total wheat and flour | 473, 540 S | STOCKS. | |
| Rye | 473, 540 S | Stocks of cereals, cotton | 477, 544 S |
| Barley | 474, 541 S | PRICES. | |
| Oats | 474, 541 S | Fixed cereal prices in Ger- | |
| Maize | 474, 541 S | many | 478 S |
| Rice | 474, 541 S | Prices by products | 479, 546 S |
| Linseed | 475, 542 S | Average monthly prices by | |
| Cotton | 475, 542 S | countries | 482 S |
| Wool | 475, 542 S | Index-numbers of prices of | |
| Butter | 475, 542 S | agricultural products | 549 S |
| Cheese | 476, 543 S | | |

AGRICULTURAL SCIENCE AND PRACTICE (255 T-294 T)

| | | | |
|----------------------------------|-------|----------------------------|-------|
| AGRICULTURAL LIBRARIES | 255 T | STRUCTION FOR RURAL BUILD- | |
| THE FORAGE PROBLEM IN THE | | INGS | 273 T |
| UNION OF SOUTH AFRICA | 264 T | THE PROBLEM OF THE QUALITY | |
| ADOPTION OF NEW TECHNICAL | | OF BREAD | 276 T |
| METHODS IN WALL CONS- | | MISCELLANEOUS INFORMATION | 283 T |
| | | BOOK NOTICES | 291 T |

PLANT PROTECTION (137 M-160 M)

| | | | |
|--------------------------------|-------|-------------------------------------|-------|
| DISCOVERIES AND CURRENT | | Australia (Western Austra- | |
| EVENTS: | | lia) | 144 M |
| Italian East Africa: Insects | | France | 144 M |
| and Other Crop Pests in | | Luxemburg (Grand Duchy | |
| 1939 | 137 M | of) | 144 M |
| France: Two Beetles Inju- | | New Zealand | 145 M |
| rious to Fruit Trees | 142 M | The Netherlands | 145 M |
| Southern Rhodesia: Locust | | Syrian Republic | 145 M |
| Invasion, 1932-40 | 143 M | Saint Vincent (Colony of) | 146 M |
| LEGISLATIVE AND ADMIN- | | Switzerland (Canton of | |
| ISTRATIVE MEASURES: | | Bern) | 146 M |
| Germany (Protectorate of | | RECENT BIBLIOGRAPHY | 147 M |
| Bohemia and Moravia) | 143 M | | |

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED
BY THE
INTERNATIONAL INSTITUTE OF AGRICULTURE



•
XXXIth Year — No. 9 — September, 1940

ROME
VILLA UMBERTO I
1940

The reproduction either in whole or in part of material printed in the Review is permitted, but only on the express condition that the source is duly acknowledged as follows: *International Review of Agriculture (International Institute of Agriculture)*.

CONTENTS

AGRICULTURAL ECONOMICS AND SOCIOLOGY (293 E-324 E)

| | |
|---|--|
| <p>CHANGES IN THE PROFITABILITY OF AGRICULTURE IN SOME EUROPEAN COUNTRIES IN 1935-36 AND 1936-37 293 E</p> <p>CROP INSURANCE 306 E</p> <p>INTERNATIONAL CHRONICLE OF AGRICULTURE: Italy 317 E</p> | <p>BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS 322 E</p> <p>NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE I. I. A. 324 E</p> |
|---|--|

AGRICULTURAL STATISTICS (553 S-610 S)

| | |
|---|---|
| <p>VEGETAL PRODUCTION.</p> <p style="text-align: center;">Articles and summaries.</p> <p>The Wheat Crop in 1940 553 S</p> <p>The Sugar Season in Europe 565 S</p> <p style="text-align: center;">Information by countries.</p> <p>Cereals 557 S</p> <p>Maize 562 S</p> <p>Rice 563 S</p> <p>Potatoes 564 S</p> <p>Sugar 566 S</p> <p>Vines 569 S</p> <p>Olives 570 S</p> <p>Flax 570 S</p> <p>Cotton 572 S</p> <p>Hemp 574 S</p> <p>Tobacco 574 S</p> | <p>Hops 575 S</p> <p>Other Products (Coffee, Groundnuts, Colza, Sesame and Soya) 575 S</p> <p>Fodder Crops 576 S</p> <p>LIVESTOCK AND DERIVATIVES.</p> <p style="text-align: center;">Articles and summaries.</p> <p>World Production and Trade of Honey and Beeswax 578 S</p> <p style="text-align: center;">Information by countries.</p> <p>Pig population in Denmark 578 S</p> <p>Current information in livestock and derivatives 592 S</p> <p>Sericulture 593 S</p> |
|---|---|

| | | | |
|-----------------------------|-------|-------------------------------|-------|
| TRADE. | | Cheese | 597 S |
| Wheat | 594 S | Cacao | 597 S |
| Wheat flour | 594 S | Tea | 597 S |
| Total wheat and flour . . . | 594 S | Coffee | 597 S |
| Rye | 594 S | STOCKS. | |
| Barley | 595 S | Stocks of cereals, cotton . . | 598 S |
| Oats | 595 S | Latest informations | 606 S |
| Maize | 595 S | PRICES. | |
| Rice | 595 S | Prices of the cereals crop of | |
| Linseed | 596 S | 1940 | 600 S |
| Cotton | 596 S | Proces by products | 603 S |
| Wool | 596 S | | |
| Butter | 596 S | | |

AGRICULTURAL SCIENCE AND PRACTICE (295 T-330 T)

| | | | |
|---|-------|---|-------|
| DIFFERENT ASPECTS OF SOIL CONSERVATION. POSSIBILI- TIES OF INTERNATIONAL COLLABORATION | 295 T | ORGANIZATION OF MILK RE- CORDING IN LITHUANIA . . . | 316 T |
| PROBLEM OF MALNUTRITION AS REGARDS THE RURAL PO- PULATION OF EUROPE . . . | 310 T | MISCELLANEOUS INFORMATION | 320 T |
| | | BOOK NOTICES | 328 T |
| | | NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE I. I. A. | 329 T |

PLANT PROTECTION (161 M-180 M)

| | | | |
|---|-------|--|-------|
| DISCOVERIES AND CURRENT EVENTS. | | LEGISLATIVE AND ADMIN- ISTRATIVE MEASURES. | |
| Argentine Republic: South American Locust (<i>Schi- stocerca paranensis</i>) In- vasion | 161 M | Germany | 165 M |
| India and Burma: New Plant Diseases Recorded in 1939 | 163 M | Germany (Protectorate of Bohemia and Moravia) | 166 M |
| Southern Rhodesia: Locust Invasion, 1932-40 . . . | 165 M | Colombia | 166 M |
| | | United States of America | 166 M |
| | | Italy | 167 M |
| | | Morocco (French Zone of) | 168 M |
| | | New Zealand | 168 M |
| | | Paraguay | 168 M |
| | | Uruguay | 168 M |
| | | RECENT BIBLIOGRAPHY . . . | 168 M |

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED

BY THE

INTERNATIONAL INSTITUTE OF AGRICULTURE



XXXIth Year — No. 10 — October, 1940

ROME
VILLA UMBERTO I
1940

The reproduction either in whole or in part of material printed in the Review is permitted, but only on the express condition that the source is duly acknowledged as follows: *International Review of Agriculture (International Institute of Agriculture)*.

CONTENTS

AGRICULTURAL ECONOMICS AND SOCIOLOGY (325 E-354 E)

| | |
|---|--|
| <p>RECENT CHANGES IN THE EUROPEAN LAND SYSTEMS AND THEIR ECONOMIC AND SOCIAL CONSEQUENCES . . . 325 E</p> | <p>INTERNATIONAL CHRONICLE OF AGRICULTURE: Mexico 343 E BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS 352 E</p> |
|---|--|

AGRICULTURAL STATISTICS (611 S-658 S)

VEGETAL PRODUCTION.

Articles and summaries.

| |
|--|
| <p>World Wheat Production and Supplies in 1940-41. . . . 611 S Maize Production in the Northern Hemisphere . . . 619 S Potatoes. 624 S The Production of Beet Sugar in 1940-41 626 S Preliminary Results and Esti- mates on the World Linseed Crops in 1940-41 632 S</p> |
|--|

Information by countries.

| |
|---|
| <p>Cereals 615 S Maize 622 S Rice 623 S Potatoes. 624 S Sugar 628 S</p> |
|---|

| |
|--|
| <p>Vines 630 S Olives 631 S Flax 638 S Cotton 638 S Hemp 640 S Tobacco 640 S Hops 641 S Other Products (Coffee, Groundnuts, Colza) . . . 641 S Fodder Crops 642 S Latest information 657 S</p> |
|--|

LIVESTOCK AND DERIVATIVES.

Information by countries.

| |
|---|
| <p>Horses, cattle and poultry in Denmark 643 S Pig population in Denmark . 644 S Current information on live- stock and derivatives . . 644 S Sericulture 645 S</p> |
|---|

| | | | |
|---------------------------------|-------|-------------------------------------|-------|
| TRADE. | | Cheese | 649 S |
| Wheat | 646 S | Cacao | 649 S |
| Wheat flour | 646 S | Tea | 649 S |
| Total wheat and flour | 646 S | Coffee | 649 S |
| Rye | 646 S | Latest information | 658 S |
| Barley | 647 S | STOCKS. | |
| Oats | 647 S | Stocks of cereals, cotton | 650 S |
| Maize | 647 S | PRICES. | |
| Rice | 647 S | Prices by products | 652 S |
| Linseed | 648 S | Average monthly prices by | |
| Cotton | 648 S | Countries | 655 S |
| Wool | 648 S | | |
| Butter | 648 S | | |

AGRICULTURAL SCIENCE AND PRACTICE (331 T-370 T)

| | | | |
|---|-------|--------------------------------------|-------|
| SORGO | 331 T | RURAL POPULATION OF EUROPE | 355 T |
| THE FORAGE PROBLEM IN THE UNION OF SOUTH AFRICA | 340 T | MISCELLANEOUS INFORMATION | 367 T |
| THE PROBLEM OF MALNUTRITION AS REGARDS THE | | BOOK NOTICES. | 368 T |

PLANT PROTECTION (181 M-208 M)

| | | | |
|--|-------|--|-------|
| DISCOVERIES AND CURRENT EVENTS. | | Spain | 193 M |
| Palestine: Diseases of Ornamental Plants | 181 M | United States of America | 194 M |
| LEGISLATIVE AND ADMINISTRATIVE MEASURES. | | Italy | 194 M |
| Germany | 192 M | Kenya (Colony and Protectorate of) | 195 M |
| England and Wales | 193 M | Morocco (French Zone of) | 196 M |
| Scotland. | 193 M | Portugal. | 196 M |
| | | Rumania | 196 M |
| | | Union of South Africa | 196 M |
| | | Uruguay | 196 M |
| | | RECENT BIBLIOGRAPHY | 197 M |

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED
BY THE
INTERNATIONAL INSTITUTE OF AGRICULTURE



XXXIth Year — No. 11 — November, 1940

ROME
VILLA UMBERTO I
1940

The reproduction either in whole or in part of material printed in the Review is permitted, but only on the express condition that the source is duly acknowledged as follows: *International Review of Agriculture (International Institute of Agriculture)*.

CONTENTS

AGRICULTURAL ECONOMICS AND SOCIOLOGY (355 E-386 E)

| | |
|--|--|
| RECENT CHANGES IN THE EUROPEAN LAND SYSTEMS AND THEIR ECONOMIC AND SOCIAL CONSEQUENCES . . . 355 E SOME OBSERVATIONS CON- CERNING THE STATISTICS OF | THE PRODUCTION AND CON- SUMPTION OF FODDER . . . 375 E BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS 385 E |
|--|--|

AGRICULTURAL STATISTICS (659 S-704 S)

| | |
|--|---|
| VEGETAL PRODUCTION. <div style="text-align: center; margin: 10px 0;">Articles and summaries.</div> World Wheat Production in 1940 659 S Sugar Season 671 S Wine Production in 1940 . . 675 S <div style="text-align: center; margin: 10px 0;">Information by countries.</div> Cereals 663 S Maize 669 S Rice 670 S Potatoes. 670 S Sugar 672 S Vines 676 S Olives 676 S Flax 677 S Cotton 678 S | Hemp 679 S Tobacco 679 S Hops 680 S Other Products (Tea, Coffee, Groundnuts, Colza, Sesame and Soyabeans) 680 S Fodder Crops 681 S LIVESTOCK AND DERIVATIVES. <div style="text-align: center; margin: 10px 0;">Articles and summaries.</div> The World Silk Production . 682 S <div style="text-align: center; margin: 10px 0;">Information by countries.</div> Cattle in Chile 682 S Current information on live- stock and derivatives . . . 682 S |
|--|---|

| | | | |
|---------------------------------|-------|-------------------------------------|-------|
| TRADE. | | Cheese | 694 S |
| Wheat | 691 S | Cacao | 694 S |
| Wheat flour | 691 S | Tea | 694 S |
| Total wheat and flour | 691 S | Coffee | 694 S |
| Rye | 691 S | | |
| Barley | 692 S | STOCKS. | |
| Oats | 692 S | Stocks of cereals, cotton | 695 S |
| Maize | 692 S | | |
| Rice | 692 S | PRICES. | |
| Linseed | 693 S | Prices for cereals of the new | |
| Cotton | 693 S | crop | 697 S |
| Wool | 693 S | Prices by products | 702 S |
| Butter | 693 S | | |

AGRICULTURAL SCIENCE AND PRACTICE (371 T-406 T)

| | | | |
|---|-------|---|-------|
| SORGO. | 382 T | NEW ASPECTS ON THE DRYING AND DISINFECTION OF CE- REALS | 391 T |
| NEW ASPECTS, THEORETICAL AND PRACTICAL OF FORAGE ENSILAGE | 371 T | MISCELLANEOUS INFORMATION | 403 T |
| | | BOOK NOTICES | 405 T |

PLANT PROTECTION (209 M-228 M)

| | | | |
|---|-------|--|-------|
| DISCOVERIES AND CURRENT EVENTS: | | LEGISLATIVE AND ADMIN- ISTRATIVE MEASURES: | |
| Italian East Africa: Notes on the Geographic Distri- bution and Biology of <i>Epilachna</i> (<i>Solanophila</i>) <i>canina</i> var. <i>scioana</i> and subsp. <i>vulpecula</i> | 209 M | Germany | 213 M |
| Switzerland: Spread of the Colorado Beetle in the Country | 211 M | Germany (Protectorate of Bohemia and Moravia) | 214 M |
| | | Germany (Oldenburg) | 215 M |
| | | Germany (Ostmark) | 215 M |
| | | Germany (Saxony) | 215 M |
| | | Germany (Württemberg) | 215 M |
| | | Italy | 215 M |
| | | Mexico | 216 M |
| | | Sweden | 216 M |
| | | Switzerland | 216 M |
| | | RECENT BIBLIOGRAPHY | 216 M |

INTERNATIONAL REVIEW OF AGRICULTURE

PUBLISHED
BY THE
INTERNATIONAL INSTITUTE OF AGRICULTURE



XXXIth Year — No. 12 — December, 1940

ROME
VILLA UMBERTO I
1940

The reproduction either in whole or in part of material printed in the Review is permitted, but only on the express condition that the source is duly acknowledged as follows: *International Review of Agriculture (International Institute of Agriculture)*.

CONTENTS

AGRICULTURAL ECONOMICS AND SOCIOLOGY (387 E-422 E)

| | |
|--|---|
| RECENT CHANGES IN THE EUROPEAN LAND SYSTEMS AND THEIR ECONOMIC AND SOCIAL CONSEQUENCES 387 E | BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS 420 E |
| INTERNATIONAL CHRONICLE OF AGRICULTURE: Sweden 411 E | NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE I. I. A. 420 E |

AGRICULTURAL STATISTICS (705 S-762 S)

| | |
|---|--|
| THE PRESENT CONDITION OF THE WORK DONE IN VIEW OF THE SECOND WORLD AGRICULTURAL CENSUS . . . 705 S | Potatoes. 726 S Sugar 728 S Vines 729 S Olives 729 S Cotton 743 S Hemp 745 S Tobacco 746 S Other Products (Coffee, Groundnuts, Colza, Sesame, Soyabeans and Sunflowers) 746 S Fodder Crops 747 S Latest information 749 S |
| VEGETAL PRODUCTION. <div style="text-align: center;">Articles and Summaries.</div> The 1940 World Wheat Crop and the Condition of Land under Wheat for the 1941 Harvest 714 S Sugar Season 727 S The World Statistical Situation of Linseed, Linseed Oil and Linseed Oil Substitutes. 730 S <div style="text-align: center;">Information by Countries.</div> Cereals 719 S Maize 724 S Rice 725 S | LIVESTOCK AND DERIVATIVES. <div style="text-align: center;">Information by Countries.</div> Cattle, Pigs and Poultry in Denmark 747 S Current Information on Livestock and Derivatives . 748 S Sericulture 748 S |

TRADE.

| | |
|---------------------------|-------|
| Wheat | 750 S |
| Wheat Flour. | 750 S |
| Total Wheat and Flour . . | 750 S |
| Rye. | 750 S |
| Barley | 751 S |
| Oats | 751 S |
| Maize | 751 S |
| Rice | 751 S |
| Linseed | 752 S |
| Cotton | 752 S |
| Wool | 752 S |
| Butter | 752 S |
| Cheese | 753 S |
| Cacao | 753 S |
| Tea | 753 S |
| Coffee | 753 S |

STOCKS.

| | |
|-------------------------------|-------|
| Stocks of Cereals, Cotton . . | 754 S |
|-------------------------------|-------|

PRICES.

| | |
|--|-------|
| Prices for Cereals of the New Crop | 755 S |
| Prices by Products | 756 S |
| Index-Numbers of Prices of Agricultural Products . . | 759 S |

APPENDIX.

| | |
|---|-------|
| The Census of Agricultural Holdings in Latvia in 1939 . | 762 S |
|---|-------|

AGRICULTURAL SCIENCE AND PRACTICE (407 T-450 T)

| | | | |
|---|-------|---|-------|
| SORGO | 407 T | MISCELLANEOUS INFORMATION | 435 T |
| CITRUS IN MOROCCO AND TUNISIA | 425 T | BOOK NOTICES | 444 T |
| ORGANIZATION OF MILK RECORDING IN JAPAN | 432 T | NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE I. I. A. | 449 T |

PLANT PROTECTION (229 M-252 M)

| | | | |
|---|-------|-----------------------------|-------|
| DISCOVERIES AND CURRENT EVENTS: | | Germany (Bavaria) . . . | 239 M |
| | | Germany (Ostmark) . . . | 240 M |
| Palestine: Diseases of Ornamental Plants (<i>concluded</i>) | 229 M | Spain | 240 M |
| | | United States of America. . | 240 M |
| LEGISLATIVE AND ADMINISTRATIVE MEASURES: | | Italy | 241 M |
| Germany | 238 M | RECENT BIBLIOGRAPHY . . . | 241 M |

AGRICULTURAL ECONOMICS AND SOCIOLOGY

AGRICULTURAL ECONOMICS AND SOCIOLOGY

MONTHLY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

CHANGES IN THE PROFITABILITY OF AGRICULTURE IN SOME EUROPEAN COUNTRIES IN 1935-36 AND 1936-37

This study begins with an outline of the general economic developments which exercised an influence upon the conditions of agriculture in the different countries and largely determined the farmers' income in 1933-37. Among these, the alignment of currencies in 1936, the general rise in the prices of agricultural products and the improvement in international trade are the most important. This introduction will be followed by an analysis of the more important accountancy results (cost of production, gross return, profit or loss on total farm assets) in the western and northern European countries: Switzerland; Overijssel (The Netherlands); Denmark; Norway; Sweden; Scotland, Devonshire and Northern Ireland (United Kingdom); Soissons and Etrépigny (France). In the next issue the eastern, south-eastern and southern European countries: Esthonia; Latvia; Lithuania; Poland; Bohemia and Moravia; Hungary; Romania; Italy will be dealt with. A brief reference will be made to the situation in Palestine.

Introduction.

Currency adjustments. — At the end of September, 1936, the Governments of the United Kingdom, France and the United States of America agreed to collaborate closely in order to strengthen international economic relations. At the same time, the French Government devalued the franc, this being an essential condition of the success of the joint effort. Belgium, Switzerland and the Netherlands immediately adhered to the tripartite agreement and devalued their currencies. The devaluation of the Italian lira took place in October, 1936, and currency adjustments were made in other countries as well.

All these decisions made a notable contribution to the restoration of a certain balance of prices on the world market, with a consequent improvement in international economic relations. In certain cases it became possible to relax the restrictions imposed upon international trade.

As devaluation leads to a rise in the prices of imported commodities, the countries where the currency had been devalued attempted to prevent this rise by lifting the embargoes on imports and controlling home prices, especially in retail trade. A tendency to a rise in prices was observed, however, in most countries, France being most seriously affected. In France, this was mostly due to political conditions, which had a considerable influence on French production and trade, as well as on public finance and the rate of exchange.

One of the objects of the present article will be to show the effects upon the conditions of agriculture in certain European countries, of the abandonment of the gold parity of their currencies by the countries of the so-called gold block.

Agricultural output. — The index of agricultural production in Europe had remained remarkably stable during the depression and the following period of recovery ⁽¹⁾. Taking the period 1925-1929 as the basis, the index numbers of the production of foodstuffs were as follows: 1925-1929 = 100; 1932 = 111; 1935 = 115; 1936 = 114.

No great change occurred in the world wheat area between 1933 and 1936, but, as the harvests were below average, current supplies of wheat were about 9 per cent. lower than the 1933 figure. In 1934, 1935 and 1936 apparent consumption was in excess of production. Wheat stocks accordingly fell from their record figure of 16.55 million metric tons on August 1, 1933, to 6.56 million metric tons on August 1, 1936.

Prices of agricultural products. — The tendency towards a rise in prices observed in the previous year became definitely pronounced during the 1936-37 season. The recovery of agricultural prices led to the restoration of the purchasing capacity of the rural population. In comparison with 1929, the relation between the prices of agricultural products and those of manufactured goods changed in favour of agriculture. In many countries wholesale prices rose more than did the cost of living.

The movement of prices of agricultural products in some of the countries dealt with may be seen from the index numbers given below (first quarter of 1929 = 100):

| | 1935 | | 1936 | | 1937 |
|-----------------------------|--------------|---------------|--------------|---------------|--------------|
| | January-July | July-December | January-July | July-December | January-July |
| England and Wales | 83.9 | 84.4 | 85.4 | 88.5 | 92.1 |
| Netherlands | 52.3 | 55.2 | 53.6 | 57.7 | 62.2 |
| Sweden | — | — | — | 118.1 | 120.8 |
| Lithuania | — | — | — | 40.9 | 46.9 |
| Poland | 45.5 | 47.9 | 45.4 | 49.5 | 55.9 |
| Hungary | 55.7 | 62.2 | 61.0 | 54.7 | 59.2 |

International trade. — By the end of 1936 it seemed as though the slow improvement observed in the volume of international trade since 1934 had become established and was also becoming more marked. Trade restrictions had, however, remained almost unchanged. Nevertheless, the devaluation of the gold block currencies in September, 1936, the stability of exchange resulting therefrom, and the readjustment of most of the controlled currencies to the level of real

⁽¹⁾ *Statistical Year-book of the League of Nations, 1936-37.*

depreciation were accompanied by a certain relaxation of trade restrictions. So long as the prices of imported commodities continued to fall, it was very difficult for the producers in those countries, where the costs of production were high, to face the competition of imported agricultural products. This was the argument brought forward by some countries such as France and Switzerland, in justification of the restriction of food imports by quotas. Agricultural protection led to increased production and stimulated economic self-sufficiency. Indeed, even, apart from the special factors which come into play in the case of agriculture, it will be seen that the rise in prices created more favourable conditions for the relaxation of trade restrictions ⁽¹⁾.

In the autumn of 1936, as the direct consequence of the currency alignment, France, Switzerland, the Netherlands, Italy, Czechoslovakia and Latvia decided to relax restrictions on imports. Denmark and Latvia lifted the duty on wheat in January, and in April the Netherlands made a considerable reduction in the monopoly duties levied on the imports of cereals and their derivatives.

During the period under review, a large proportion of the trade of continental Europe continued to be governed by clearing agreements. Payment agreements, which afford a greater freedom to trade, began, however, to be substituted for clearing agreements; the volume of trade showed a tendency to increase and official control was slightly relaxed; the bonds hampering private enterprise were somewhat slackened and it became possible to discern some signs of a tendency towards a return to customary methods of financing trade operations. Simultaneously, however the tendency to conclude bilateral agreements became more marked, and consequently the struggle between the various trends was intensified.

A trade agreement was concluded between Germany and Denmark in December, 1936. Germany undertook to purchase 70 million crowns worth of Danish products during the first quarter of 1937; German purchases from Denmark during the second quarter were to represent a certain percentage of Danish imports from Germany during the first quarter, due account being taken of the excess of imports required to effect a progressive liquidation of Danish credits in blocked marks.

Germany also developed her trade with the countries of South-East Europe. Imports from Hungary and Rumania, the two south-eastern European countries which will be discussed in the present article, increased from 34 million and 46 million R. M. in 1933 to 93 million and 92 million respectively in 1936; German exports to Hungary and Rumania increased from 38 million and 46 million R. M. in 1933 to 83 million and 104 million respectively in 1936. German purchases have caused notable changes in the economic organization of these countries: the cultivation of food crops has been reduced and replaced by that of fodder crops, while the output of raw materials has been increased; the production of flax fibre has been increased in Hungary and that of linseed in both Hungary

⁽¹⁾ International Payments Bank, *Seventh Annual Report*, p. 11.

and Romania; the growing of soya beans has been increased in Bulgaria and Romania, and hemp-growing in Yugoslavia.

Taken as a whole, the outcome of these efforts tending towards greater freedom of trade has been very restricted, while new currency difficulties have arisen involving a further depreciation of the French franc. Among the countries which are still somewhat backward in their progress towards recovery are Switzerland and Denmark (Diagram I). It would appear that the countries of central and eastern Europe have benefited most widely from the general improvement in economic conditions; this improvement has been largely due to an increase in German purchases of agricultural products. The prosperity of these countries is in striking contrast to their situation when the depression was at its worst. A greater improvement has taken place in the returns on capital invested in farming in Eastern and, particularly, in South-Eastern Europe, than in the western countries, such as Switzerland:

Net return in percentage of farm assets.

| | Average 1930-33 | 1934-35 | 1935-36 | 1936-37 |
|-----------------------|-----------------------|---------|---------|---------|
| Switzerland | 1.58 | 1.36 | 2.47 | 3.20 |
| Lithuania | 0.93 | 0.73 | 1.70 | 4.52 |
| Latvia | 0.12 | 3.36 | 2.23 | 2.87 |
| Poland | 0.60 | 0.92 | 2.80 | 3.30 |
| Hungary | (¹) 2.14 | 1.84 | 2.64 | 5.31 |
| Romania | (¹) 2.62 | 7.44 | 9.57 | 11.06 |

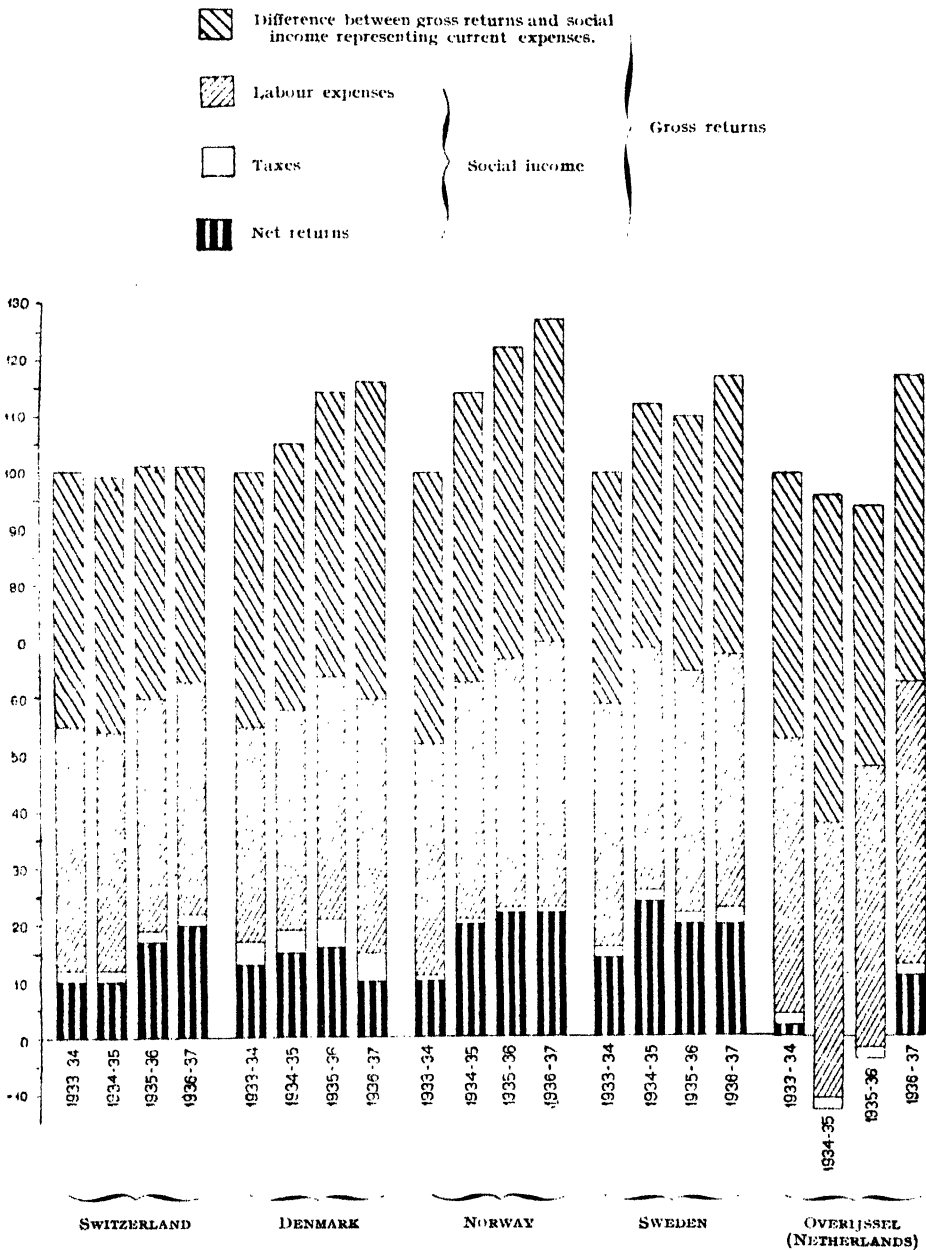
(¹) In 1930-31.

Returns of agriculture. — The present article will consist of a study of the changes in profitability of agriculture from 1935-1936 to 1936-37 in the following countries: Switzerland, Denmark, Norway, Sweden, Overijssel (The Netherlands), Soissons and Etrépnay (France), Scotland, Devonshire, Northern Ireland (United Kingdom), while the next article will contain a similar study concerning the countries of central, eastern and south-eastern Europe (¹). Diagram I shows the variations which have occurred in the gross returns, in the social income and in the components of the latter from 1933-34 to 1936-37 in Switzerland, Denmark, Norway, Sweden and Overijssel, for which general averages have been used. In Switzerland the average gross return on farms made no progress in 1936-37; the net return increased, however, which shows that farm expenses have declined. The social income has improved. In Denmark the average gross return showed a slight increase in 1936-37, but farm expenses increased considerably, and consequently the net return was much lower. The decline in social income was not so pronounced as was the fall in the net return, owing to an increase in two of its component parts, labour expenses and taxes.

In Norway and Sweden the gross returns and farm expenses increased in the same proportion in 1936-37, the net return remaining at the same level as

(¹) No accountancy results have been received from Germany.

DIAGRAM 1. — *Average gross returns and social income of farms in Switzerland, Denmark, Norway, Sweden and Overijssel (Netherlands) from 1933-34 to 1936-37 (Gross returns for 1933-34 = 100).*



in 1935-36; the increase in social income was due to the rise in the share of labour. The changes in the Overijssel area were of an entirely different character. There was on the average no net return from the farms in this province of the Netherlands in 1935-36; farm expenses were so high that the gross return was not sufficient to cover the farmer's taxes and his labour expenses. In 1936-37 the gross return increased by 24 per cent. and the net return, as compared with gross return, became almost as high as in the other countries reviewed.

Analysis of results for certain countries of western and northern Europe.

Switzerland. --- The economic situation improved considerably in 1936-37. The increase in wholesale prices after the devaluation of the franc was greater than that in retail prices; quotations of securities improved. Imports and exports also made marked progress, the excess of the former during the first six months of 1937 being two and a half times as large as it had been for the corresponding period of 1936.

Taken as a whole, the prices of agricultural products showed only a slight advance, the index rising from 110 in 1935 to 119 in 1936 (1914 = 100). The prices of the more important agricultural products, such as milk, cereals, fruit and brandy, are fixed in Switzerland by producers organizations more or less closely dependent on the government. The price of milk remained unaltered. Wheat prices were fixed at 36 frs. per 100 kgs. for Standard type I, 37.50 frs. for standard type II, 38 frs. for standard type III, and the price for rye was fixed at 28.50 frs. The Federal Department of Public Economy adopted measures for the encouragement of the sale of livestock in the country, and granted extraordinary subsidies to the stockbreeding organisations for bulls, rams and male goats purchased at the regular shows. The Federal Council also instituted subsidies in order to reduce the cost of transport of cattle and goats from the stock-breeding districts. Owing to the system of quotas introduced by the decree of August 6, 1935, the number of pigs offered on the market in 1936-37 did not exceed the possibility of absorption, and prices were consequently stabilized. The supplementary import duties imposed on feeding stuffs were removed on December 29, 1936, and replaced by super-taxes which came into force on January 1, 1937. The value of imports of feeding stuffs (including hay), which had reached the exceptional figure of 129.1 million francs in 1928, declined in 1936 to some 40 million francs.

While the gross returns remained much the same as in 1935-36, the costs of production fell considerably in 1936-37.

The farms which showed the most marked improvement were those mainly engaged in pig fattening and cattle breeding. Their gross returns fell indeed between 1935-36 and 1936-37; but the decline in their costs of production was even more pronounced. Alpine stock-breeding farms also benefited considerably by the fall in the costs of production. Only the farms practising the improved three-course system showed a greater loss in 1936-37 than in the preceding year:

TABLE I. — *Costs of Production, Gross Return and Profit or Loss on total farm Assets in Switzerland in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|--|-----------------------|--------------|----|--------------------|--------------|-------|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | B |
| Farms operated mainly for: | | | | | | |
| pig fattening | 1729 | 1599 | 92 | 1490 | 1456 | 97 |
| cultivation of mixed fodder crops | 1149 | 1057 | 92 | 1137 | 1074 | 94 |
| exclusively for grazing | 1318 | 1181 | 90 | 1250 | 1171 | 93 |
| fruit growing | 1903 | 1752 | 89 | 1832 | 1698 | 93 |
| production of dairy produce | 1188 | 1055 | 89 | 1134 | 1040 | 92 |
| cattle breeding | 1288 | 1140 | 88 | 1200 | 1131 | 93 |
| farms run on the improved 3 year rotation system | 1200 | 1050 | 88 | 1164 | 1016 | 87 |
| alpine stockbreeding farms | 906 | 788 | 70 | 913 | 823 | 90 |
| Average | 1215 | 1081 | 86 | 1171 | 1083 | 92 |
| Profit or loss on total farms assets | | | | | | |
| | in francs per hectare | | | % of gross return | | |
| | 1935-36 | 1936-37 | | 1935-36 | 1936-37 | |
| Farms operated mainly for: | | | | | | |
| pig fattening | 130 | 49 | — | 8.13 | — | 2.75 |
| cultivation of mixed fodder crops | 92 | 63 | — | 8.70 | — | 5.87 |
| exclusively for grazing | 137 | 88 | — | 11.60 | — | 7.52 |
| fruit growing | 211 | 164 | — | 12.04 | — | 9.83 |
| production of dairy produce | 133 | 94 | — | 12.61 | — | 9.04 |
| cattle breeding | 148 | 78 | — | 12.98 | — | 6.90 |
| farms run on the improved 3 year rotation system | 144 | 148 | — | 13.63 | — | 14.57 |
| alpine stockbreeding farms | 208 | 90 | — | 26.39 | — | 10.94 |
| Average | 134 | 88 | — | 12.30 | — | 8.13 |

A = in gold francs per hectare.

B = per 100 francs of costs of production.

their gross return fell more than did their costs of production. It should be noted, however, that when we speak here of losses, we refer to the farmer in his entrepreneurial capacity. The loss of his entrepreneurial profit does not necessarily deprive him and his family of the means of subsistence, even if the fall in his farm income does not permit him to make savings. This type of farm would appear, indeed, to be less able to adapt itself to changes in the economic situation than the others.

Generally speaking, the increase in the prices of agricultural products which would have been necessary to allow the gross return exactly to cover the cost of production, was considerably smaller in 1936-37 than in 1935-36 (8 per cent. instead of 12 per cent.).

The Netherlands (Overijssel). — The evolution of the general economic situation in the Netherlands was definitely favourable in 1936-37. Before the devaluation of the currency this country had adopted a strict deflation policy as regards all the factors affecting cost of production. The devaluation of the florin led to a rise in wholesale prices and in the prices of shares without bringing about any marked increase in the cost of living. From June, 1936, to June, 1937, wholesale prices advanced by 24 per cent., retail prices by 7 per cent. and share prices by 60 per cent. It was not until the second quarter of 1937 that a similar rise in prices took place in other countries. The increase in production was more marked in the industries producing investment goods than in those producing consumers' goods. Both imports and exports made considerable progress.

The prices of imported agricultural products in Dutch currency rose considerably after the abandonment by the Netherlands of the gold standard. This made possible a revision and simplification of some of the measures of intervention adopted during the depression. These measures consisted in a monopoly or in the quantitative regulation of imports of certain agricultural products. There were also monopoly taxes, which were levied for the twofold purpose of raising the prices on the home market and of helping the farmers financially.

The following table of index numbers of prices paid to the producers (1924-1925 to 1928-29 = 100) shows the movement of prices of agricultural products in the Netherlands during the three years 1934-35 to 1936-37:

| | 1934-35 | 1935-36 | 1936-37 |
|---------------------|---------|---------|---------|
| Wheat. | 77 | 70 | 68 |
| Rye | 65 | 63 | 75 |
| Barley. | 73 | 64 | 71 |
| Oats | 60 | 59 | 69 |
| Potatoes | 73 | 53 | 60 |
| Beef | 54 | 47 | 61 |
| Pig meat | 44 | 50 | 57 |
| Butter. | 51 | 55 | 58 |
| Cheese. | 44 | 47 | 48 |
| Fresh milk. | 60 | 64 | 67 |
| Eggs | 41 | 43 | 49 |

The relatively higher prices obtained for vegetal products did not bring about a conversion of meadows into arable to any significant extent, as most of the meadows consist of poor arable land. In order to restrict animal production, the rearing of calves and pigs was made subject to the issue of a permit. An export monopoly was instituted at the end of 1936; only exporters belonging to the crisis organisation for dairy produce were entitled to export specified dairy products to countries to be designated.

The central organization for enforcing measures adopted in connection with the crisis in the pig industry paid prices varying according to quality. During

certain periods this organization limited its purchases to bacon pigs weighing less than 60 kg. As a result of these measures the total number of pigs fell from 2,082,000 in May, 1934, to 1,406,000 in May, 1937. This eased the market and had a favourable effect on prices.

The price of home-grown breadmaking wheat is fixed before the sowings take place. It is remunerative and compares very favourably with the prices of other products. Consequently farmers tried to produce as much wheat as possible and the Government had to intervene, reducing the area sown to wheat (except on the smallest farms) to one third of the arable. The various bonuses and subsidies granted for rye, barley and oats keep prices at a relatively low level; this is most satisfactory, as these cereals are used chiefly for feeding livestock, and the costs of animal products must be kept as low as possible. It is a well-known fact that cattle and pig breeding are very important industries in the Netherlands; since large quantities of skimmed milk, buttermilk and whey

TABLE 2. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets on the Overijssel farms in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|------------------------------------|--------------------|--------------|-----|--------------------|--------------|----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | | A | B | | A | B |
| Sandy districts | 333.05 | 249.57 | 75 | 358.39 | 308.62 | 86 |
| Sandy and peat districts | 72.13 | 205.35 | 75 | 300.70 | 276.80 | 92 |
| Grazing districts | 264.65 | 200.20 | 76 | 282.63 | 260.96 | 92 |
| IJsselstreek districts | 293.18 | 243.33 | 83 | 282.68 | 274.23 | 97 |
| Marshy districts | 295.74 | 324.65 | 110 | 290.96 | 284.42 | 98 |
| Average | 301.63 | 231 — | 77 | 321.62 | 287.46 | 89 |

| | Profit or loss on total farm assets | | | |
|------------------------------------|-------------------------------------|---------|----------------------|---------|
| | In florins per hectare | | In % of gross return | |
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| Sandy districts | — 83.48 | — 49.77 | — 33.44 | — 16.13 |
| Sandy and peat districts | — 66.78 | — 23.90 | — 32.52 | — 8.30 |
| Grazing districts | — 64.45 | — 21.67 | — 32.19 | — 3.08 |
| IJsselstreek districts | — 49.85 | — 8.45 | — 20.48 | — 8.63 |
| Marshy districts | 28.91 | — 6.54 | 8.90 | — 2.30 |
| Average | — 70.63 | — 34.16 | — 30.57 | — 11.88 |

A = florins per hectare.

B = per 100 florins of costs of production.

are left over every year, farmers have to use these by-products for fattening calves and especially pigs.

Restrictions have also been put on the area sown to vegetables in the open or under glass, and also on the area planted with flowering bulbs and flowers; the size of orchards and nurseries has also been restricted and the horticultural situation has consequently been slowly improving.

As a result of all the measures taken by the Government, agriculture in the Netherlands was freed in 1936-37 from the very difficult situation of the previous years. A study of Diagram I has shown the extent of improvement registered in the average gross return, net return and social income of all the groups of farms of the Overijssel district in 1936-37. We will now examine the improvement which occurred in the various farm groups of the same district.

The increase in the gross return was much more rapid than that in the costs of production, except on the farms in the marshy areas, where the gross return and the costs of production declined, the latter in a much smaller proportion than the former. These farms in the marshy areas are devoted chiefly to the cultivation of cereals and have lost much of the privileged position they formerly enjoyed. Instead of making a profit of 28.91 florins per hectare as in 1935-36, they lost 6.54 florins per hectare in 1936-37. This situation was due in large measure to the steps taken by the Government in order to reduce the area sown to wheat and to the fall in its price. The IJsselstreek farms succeeded in lowering the costs of production; since the gross return increased, they found themselves in a better position in 1936-37 than the farms in the grazing, sandy and sandy and peat districts, where the increase in gross returns was not accompanied by a decline in the costs of production.

Generally speaking, the loss to farmers in the Overijssel district declined by about 36 florins per hectare between 1935-36 and 1936-37. To bring the gross return to a figure at which it would cover the costs of production, the prices of agricultural products would have had to be raised by 11.83 per cent. in 1936-37, as compared with 30.57 per cent. which would have been necessary in 1935-36.

Denmark. — Denmark offers an example of an exporting agricultural country exposed to the trade restrictions established by the countries providing the main outlets for her exports. The United Kingdom had the largest share of these exports, while Germany supplied the highest percentage of the goods imported into the country. After Danish exports to the United Kingdom were restricted in 1932, the new British trade policy compelled Denmark to turn to the United Kingdom rather than to Germany for her imports. Ever since 1934, on the other hand, German purchases from Denmark have been increasing. Between 1935 and 1936, Danish imports from the United Kingdom fell from 36 to 32.5 per cent. while imports from Germany increased from 22 to 25.3 per cent. of the total. Exports to the United Kingdom delined from 58 to 54 per cent. while exports to Germany increased from 16.3 to 20.3 per cent. Denmark also made a serious attempt to reorganize trade and production by seeking new markets in many of the smaller countries.

No fundamental changes were made in the regulation of the Danish agricultural market during the period 1936-37. Some of the existing regulations were amended or replaced by new ones. Imports of cereals, flour and feeding stuffs for livestock were taxed. A tax was also imposed on all pigs killed for human consumption. The restriction imposed on pig imports in Great Britain placed the Danish breeders in a very difficult position, and the pig market had to be regulated. In this way a considerable reduction in the number of animals was achieved. Pigs numbered only just over 3,000,000 in 1937, while in 1931 their number reached 5,500,000.

The tax on all butter sold on the home market guarantees a minimum price to producers. As long as the price of this product is maintained at or above 2.60 crowns per kg. no tax is imposed; when the price falls below 2.60 per kg. a tax covering the difference is imposed.

TABLE 3. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets in Denmark in 1935-36 — 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|--|--------------------|--------------|-----|--------------------|--------------|----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | | A | B | | A | B |
| Farms with an area of less than 10 hectares | 922 | 888 | 96 | 969 | 870 | 99 |
| Farms with an area between 10 and 20 hectares | 962 | 958 | 99 | 719 | 669 | 93 |
| Farms with an area between 20 and 30 hectares | 570 | 567 | 99 | 603 | 563 | 93 |
| Farms with an area between 30 and 50 hectares | 522 | 516 | 99 | 558 | 523 | 94 |
| Farms with an area between 50 and 100 hectares | 475 | 480 | 101 | 505 | 478 | 95 |
| Farms with an area over 100 hectares | 440 | 438 | 99 | 475 | 456 | 96 |
| Average . . . | 618 | 609 | 99 | 664 | 616 | 93 |

Profit or loss on total farm assets

| | crowns per hectare | | % of gross return | |
|--|--------------------|---------|-------------------|---------|
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| Farms with an area of less than 10 hectares | — 34 | — 93 | — 3.83 | — 10.62 |
| Farms with an area between 10 and 20 hectares | — 4 | — 50 | — 0.61 | — 7.47 |
| Farms with an area between 20 and 30 hectares | — 3 | — 40 | — 0.53 | — 7.10 |
| Farms with an area between 30 and 50 hectares | — 6 | — 35 | — 1.16 | — 6.99 |
| Farms with an area between 50 and 100 hectares | — 5 | — 27 | — 1.04 | — 5.65 |
| Farms with an area over 100 hectares | — 2 | — 19 | — 0.46 | — 4.16 |
| Average . . . | — 9 | — 48 | — 1.48 | — 7.79 |

A = crowns per hectare.

B = per 100 crowns of costs of production.

The measures taken by the authorities have maintained the level of the gross return, endangered by poor crops. As has been said above, however, the costs of production have increased too much, the increase in wages being especially severe, so that the balance was on the wrong side.

The gross return on farms with an area between 10 and 20 hectares and on those over 100 hectares increased in 1936-37; as the result of a relatively even greater increase in the costs of production, however, their position was no better than that of farms belonging to the other groups. The average loss on Danish farms increased by 39 crowns per hectare in 1936-37. While the price of agricultural products would have had to be increased by 1.48 per cent. in 1935-36 to allow the gross return to cover the costs of production, the increase in 1936-37 would have had to be 7.79 per cent. As has been said, these conditions were due to bad crops coupled with an increase in wages.

Norway. — In spite of poor crops in 1936 (88.6 per cent. of the average) the measures adopted by the authorities in favour of agriculture prevented a deterioration in the economic situation of the farmers (Diagram I). The Government has the monopoly of imports of wheat, rye, barley and all milled products; it purchases all cereals produced in the country and pays a bonus to farmers. The Government also pays subsidies on the transport of cereals. In order to improve the conditions of the milk and dairy produce market, the Government imposed a levelling tax, a tax on the sale of milk and another on margarine; an order was also issued making an addition of butter to margarine compulsory, while butter imports were prohibited. The tax on the sale of milk amounts to 0.25 öre per litre, that on margarine to 10 öre per kg. Imports of animal fats were made subject to permits. These and other less important measures kept the price of butter in Norway at about 1 crown per kg. above the world price and ensured farmers an annual increase in revenue estimated at 40 million crowns.

A tax of 1.50 crowns per whole animal weighing over 15 kg. and of 0.75 of a crown for smaller animals and half carcasses has been imposed on all pigs for slaughter. The tax on sheep is 0.25 of a crown per home-grown animal. All concentrated feeding stuffs for livestock are also taxed; the tax varies in accordance with conditions on the world market, but must not exceed 6 öre per kg. Certain quantities are exempt from this tax. Small farms purchasing under 1200 kg. of concentrated fodder per annum enjoy the following exemption: 300 kg. per head for all two-year old horned animals or horses; 100 kg. per head for the same animals between 4 months and 2 years; 250 kg. per head for all pigs used for breeding purposes; 150 kg. for all pigs for slaughter; 40 kg. per head for goats.

The general index for prices of agricultural products (1909-14 = 100) has increased from 138 to 142; the price indices for articles needed by agriculture and for wages advanced from 143 to 151 and 152 to 162 respectively. A study of diagram I has shown the proportion of increase in the average gross return on Norwegian farms; it has been seen that the average net return has neither increased nor declined. We must now ascertain the loss to farmers in the different districts of the country.

TABLE 4. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets on Norwegian farms in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|-------------------------------------|--------------------|--------------|-------------------|--------------------|--------------|----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | B |
| Trøndelag | 510.70 | 454.20 | 89 | 520 — | 505 — | 97 |
| Sörlandet | 1,030.60 | 939 — | 91 | 1,079.40 | 1,030.20 | 95 |
| Vestlandet | 594.80 | 524 — | 88 | 629.20 | 586.20 | 93 |
| Mountain districts | 605.90 | 518.30 | 85 | 692.20 | 644.80 | 93 |
| Oestlandet | 697.60 | 681.10 | 98 | 714.30 | 681.10 | 95 |
| Nordland | 462.50 | 447.70 | 97 | 469.80 | 422.40 | 90 |
| Average | 674.40 | 639.10 | 95 | 696.83 | 663.16 | 95 |
| Profit or loss on total farm assets | | | | | | |
| | Crowns per hectare | | % of gross return | | | |
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 | | |
| Trøndelag | — 56.50 | — 15 — | — 12.44 | — 2.97 | | |
| Sörlandet | — 91.60 | — 49.20 | — 9.75 | — 4.77 | | |
| Vestlandet | — 70.80 | — 43 — | — 13.51 | — 7.33 | | |
| Mountain districts | — 87.60 | — 47.40 | — 16.90 | — 7.35 | | |
| Oestlandet | — 16.50 | — 33.20 | — 2.42 | — 4.87 | | |
| Nordland | — 14.80 | — 47.40 | — 3.31 | — 11.22 | | |
| Average | — 35.30 | — 33.67 | — 5.52 | — 5.08 | | |

A = Norwegian crowns.

B = per 100 crowns of costs of production.

The fact that the farms in the Oestlandet district are by far the most numerous explains why the average tends towards the last two groups in which the gross returns have not increased. Although the average net return neither increased nor declined in 1936-37, the average profit or loss on total farm assets improved slightly, showing that the average loss of Norwegian agriculture was not quite so great in 1936-37 as in 1935-36. The position of the first four groups of farms was better in 1936-37 while that of the last two groups was worse. The cost of production in the Oestlandet and Nordland districts did not increase in the same proportion as in the rest of the country, but the gross return remained stationary or declined. The results of the bad harvest were most severely felt in the north.

Sweden. — Many signs indicated an improvement in the economic situation in 1936-37: production increased, trade improved rapidly and the gold reserve increased in spite of the increase in the adverse trade balance. The prosperity of the country was so marked that the possibility of isolating the national economy was contemplated in order to prevent it from being affected by the inflationary tendencies which prevailed abroad.

Agricultural conditions, however, were not so favourable in 1936-37. The average gross return of Swedish farming increased by 7 per cent. in 1936-37 as the result of good crops, energetic government intervention and an increase in the prices of agricultural products. It has been seen, however (diagram I), that the average net return had not increased. The prices of agricultural products had not regained the relatively high level of the period from 1925 to 1929, to which the Government sought to raise them by its policy. On the other hand, the indices given below show that wages were higher in 1936-37 than in 1925-29, while the prices of agricultural requisites had almost recovered the level of that period.

Index numbers of prices of agricultural products, wages and agricultural requisites as established by the Swedish General Society for Agriculture (1925-29 = 100):

| | 1935-36 | 1936-37 |
|----------------------------------|---------|---------|
| Agricultural products | 79 | 87 |
| Wages | 91 | 98 |
| Agricultural requisites. | 86 | 91 |

Very few alterations were made in 1936-37 in the measures taken by the Government to support the agricultural markets. A few changes were made in the regulation of the cereal market in connection with export licences, the compulsory admixture of a certain percentage of home-grown wheat and rye to flours; Government purchases to maintain the price level; import permits for breadstuff cereals and their derivatives; the tax on wheat and the import tax on certain wheat derivatives. The former of these two taxes fluctuated between 2.5 and 0.5 öre per kg., while the latter was raised to 4 öre per Kg.

The tax on milk sold in the country or converted into dairy produce fluctuated between 1 and 2 öre per kg.

In order to prevent an increase in the consumption of margarine to the detriment of the butter market, an excise duty was imposed on margarine, artificial fats and other butter and lard substitutes. In 1936-37 this tax amounted to between 20 and 45 öre per kg. The revenue from the taxes on milk and its derivatives and from the excise duty on margarine was used to pay bonuses on butter exports. The price of livestock was maintained by restrictions on imports, subsidies on exports and the organization of the latter, as well by freezing meat and melting down bacon.

All these measures would have rendered agriculture as prosperous as every other branch of Swedish activity, had the costs of production not increased too much. The margin between the gross return and the costs of production, as will be seen from the following figures, was increased to the detriment of the former.

TABLE 5. — *Costs of Production, Gross Return, Profit or Loss on total and Farm Assets in Sweden in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|--------------------------|--------------------|--------------|-----|--------------------|--------------|-----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | A |
| Upper-Norrland | 371 | 332 | 89 | 402 | 381 | 95 |
| Lower-Norrland | 393 | 369 | 94 | 445 | 395 | 89 |
| Central area | 341 | 331 | 97 | 355 | 347 | 98 |
| Southern area | 469 | 509 | 108 | 497 | 526 | 106 |
| Average | 390 | 397 | 102 | 420 | 424 | 101 |

Profit or loss on total farm assets

| | Crowns per hectare | | % of gross return | |
|--------------------------|--------------------|---------|-------------------|---------|
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| | A | B | A | B |
| Upper-Norrland | 30 | 21 | 11.75 | 5.51 |
| Lower-Norrland | 24 | 50 | 6.50 | 12.66 |
| Central area | 10 | 8 | 3.02 | 2.30 |
| Southern area | 40 | 29 | 7.85 | 5.51 |
| Average | 7 | 4 | 1.76 | 0.94 |

A = crowns per hectare.

B = per 100 crowns of costs of production.

In 1936-37 expenses were highest in the districts of Lower Norrland and in the South. In Upper Norrland and in the central area the gross return increased more than the costs of production; the farmers' losses were therefore reduced in these two districts in 1936-37, while they increased in Lower Norrland. After having realized an average profit of 40 crowns per hectare in 1935-36, the farmers in the South saw these profits decline to 29 crowns per hectare in 1936-37. Taken as a whole, the situation of Swedish agriculture deteriorated in 1936-37, compared with 1935-36.

France. — (Soissons, Etrépagne). — The benefits of devaluation in France were thwarted by political and social developments. In spite of various signs of industrial recovery observed after the devaluation in September 1936, the continued depreciation of the franc caused apprehension and prevented France from reaping the fruits of this measure. Production diminished after March, 1937, while the cost of living showed a marked increase. The application of new industrial agreements, including the 40-hours law, led to new struggles and to a marked increase in the costs of production, which extended the rise in the

level of prices. French foreign trade, which had been seriously affected by the depression, as well as by the prolonged adherence to the gold standard, recovered after the devaluation of September, 1936. This fall in the value of the currency led to an increase in farm profits. In spite of a quantitatively mediocre output, the situation of farmers was more or less satisfactory, as the currency situation led to a rise in prices. Wheat, which had been quoted at 73 francs per quintal in 1935, rose to 140 in September, 1936, and to 180 in 1937. The price of wine increased almost fourfold between 1935-36 and 1937-38. The increase in the price of meat, and especially of milk, was not nearly so great. Farmers in the Soissonnais profited so greatly by the rise in the price of their products that the gross return on their farms increased by 36 per cent. in 1936-37. It should be repeated that this increase was due above all to the influence of the currency situation; indeed, if the depreciation of the franc is taken into account, the increase in the gross return amounts to only 4 per cent. (diagram II) ⁽¹⁾.

The increase in gross return was not accompanied by a proportionate improvement in net return owing to the increase in costs. This increase was due to a rise

TABLE 6. — *Costs of Production, Gross Return and Profit or Loss on total Farm Assets in the Soissonnais and Etrépagny areas in 1935-36 and 1936-37.*

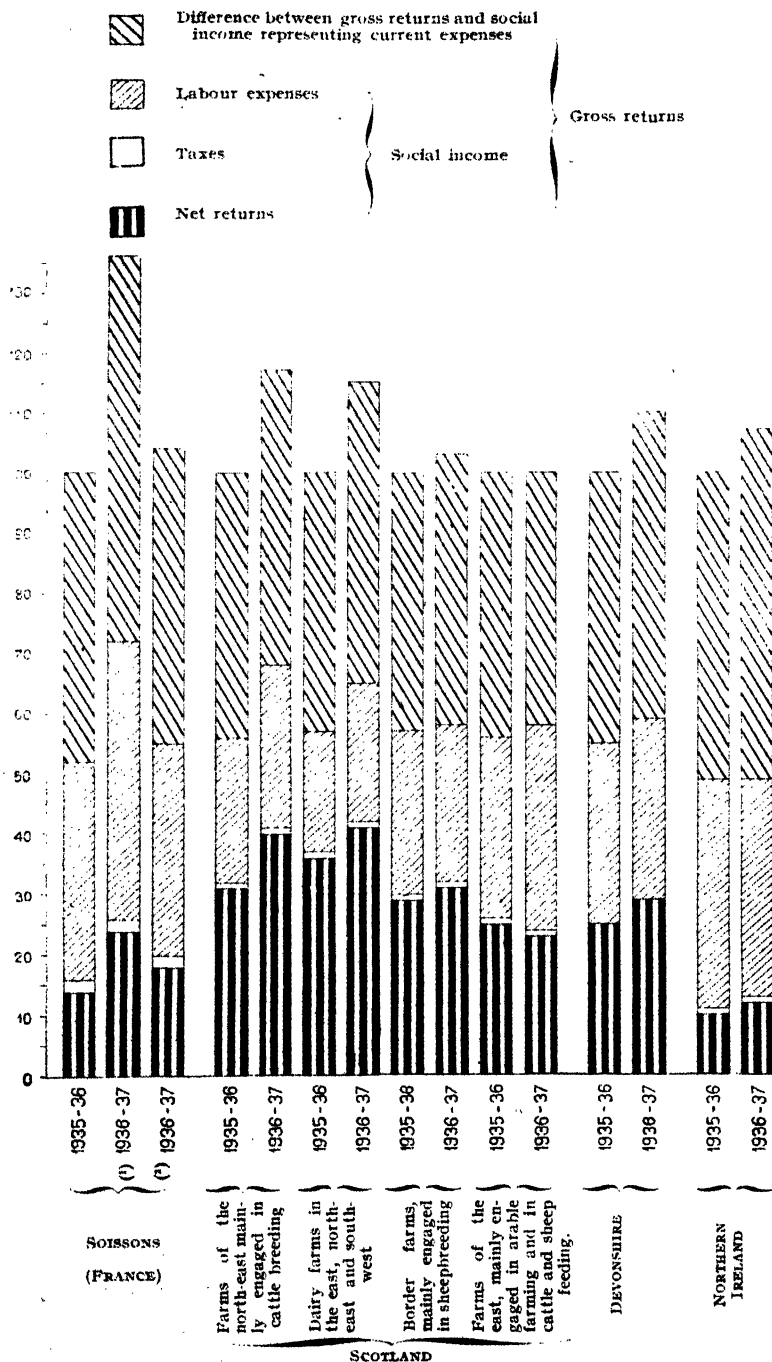
| | 1935-36 | | | 1936-37 | | |
|---------------------|--------------------|----------|--------------|--------------------|----------|--------------|
| | Cost of production | | Gross return | Cost of production | | Gross return |
| | A | A | B | A | A | B |
| Soissons | 2,428.51 | 2,338.18 | 96 | 3,136.05 | 3,178.62 | 101 |
| Etrépagny | 2,457.04 | 2,348.10 | 96 | 2,656.42 | 2,596.10 | 98 |

| Profit or loss on total farm assets | | | | |
|-------------------------------------|---------|-------------------|---------|------|
| Francs per ha. | | % of gross return | | |
| 1935-36 | 1936-37 | 1935-36 | 1936-37 | |
| Soissons | 90.33 | 42.57 | 5.41 | 1.34 |
| Etrépagny | 108.94 | 60.32 | 4.87 | 2.32 |

A = francs per hectare.
B = per 100 francs of costs of production.

⁽¹⁾ This diagram differs from the former one in that it refers only to the two years 1935-36 and 1936-37. The data for Scotland and Soissons for 1933-34 and 1934-35 were too few to enable comparisons to be made. As to Devonshire and Northern Ireland, the number of farms is also very small, and they are grouped only according to size.

DIAGRAM II. — Gross returns and social income of farms in Soissons (France) and in Scotland, Devonshire and Northern Ireland (United Kingdom) in 1935-36 and 1936-37. (Gross returns for 1935-36 = 100).



in wages paid to farm workers and in social charges and also to a rise in the cost of agricultural implements. The increase in the prices of agricultural machinery is estimated at between 30 and 50 per cent., in those of fertilizers at from 15 to 25 per cent. The net return, nevertheless, showed a considerable advance. The balance of profit or loss on total farm assets also showed a marked improvement. As will be seen from the following figures, considerable differences were registered from one district to another.

In 1936-37 the Soissonnais peasant made a profit of 1.34 francs per 100 francs of gross return. In spite of the increase in prices of agricultural produce, the gross return in the Etrépagne area did not suffice to cover the costs of production; the farmers' loss amounted to some 60 francs per hectare, or to 2.32 francs per 100 francs of gross return.

United Kingdom (Scotland, Devonshire, Northern Ireland). — Economic conditions in Scotland were on the whole favourable to agriculture in 1936-37. The economic indices: production, commercial activity, international trade, labour, prices, all contributed to the farmers' prosperity.

During the period under review the prices of agricultural products increased substantially in comparison with those of other goods, the general index for England and Wales ⁽¹⁾ (1911-13 = 100) having risen from 116 in June, 1936, to 131 in June, 1937. The following figures show the changes which occurred in the value of the production of scottish agriculture between 1930-31 and 1936-37:

| | |
|-------------------|-----|
| 1930-31 | 100 |
| 1931-32 | 95 |
| 1932-33 | 83 |
| 1933-34 | 86 |
| 1934-35 | 95 |
| 1935-36 | 98 |
| 1936-37 | 107 |

The output of meat animals was the same in Great Britain in 1936-37 as in the previous year, but the increase in demand led to a rise in prices, the index advancing from 95 in 1935-36 to 103 in 1936-37. A similar situation existed on the market for fat sheep during the summer and autumn of 1936: increased demand and high prices. In 1937, the supply of sheep on the home market diminished, and prices rose abnormally. The decline in supply was probably due in part to bad weather conditions and in part to the fact that larger numbers of young sheep were held back for breeding. A cyclic movement tends, indeed to adjust the number of sheep, which was too low in 1936, but the high prices ruling at the end of the year and during the first quarter of 1937 stimulated breeding, and the flocks increased in 1937. It was not until May, 1937, that prices began to fall; but this decline was not reflected in the accountancy results for 1936-37.

(1) Given the fact that Scotland and England are parts of the same market, the index numbers of prices for England and Wales can be referred to with regard to Scotland as well.

Industrial activity led to a considerable expansion of the demand for wool, and prices of this product rose sharply: the index rose from 87 in 1935-36 to 127 in the following year.

The measures for the control of beef and mutton imports continued in force. Imports of these foodstuffs, however, were larger in 1936-37 than in 1935-36.

In spite of a slight rise in prices, the gross return of the dairy industry did not increase in proportion to its increase in other branches of agriculture. The reason for this is to be found in increased expenses, and especially in those incurred for the purchase of feeding stuffs, as well as in the shortage of labour and higher wages. Preference was also given in many cases to the rearing and fattening of cattle.

A smaller area was sown to wheat and barley in 1937 than in 1936, but the factor which really contributed to an appreciable rise in the prices of cereals in Scotland during the 1936-37 season was the situation on the world market of cereals. The decline in world production and stocks of cereals and the consequent rise in cereal prices, have already been mentioned above; they were due to the drought experienced in North America, to the reduction in the area sown to wheat in several countries and to increased demand. As regards wheat, mention should be made of deficiency payments made to farmers under the *Wheat Act*.

The following table shows the fluctuations which occurred in the index prices of agricultural products between 1935-36 and 1936-37 (1911-13 = 100):

| | 1935-36 | 1936-37 |
|-------------------------------|---------|---------|
| Wheat. | 120 | 130 |
| Barley. | 101 | 126 |
| Oats | 87 | 113 |
| Potatoes | 173 | 186 |
| Fatstock | 110 | 118 |
| Cattle for breeding | 92 | 105 |
| Sheep fatstock | 123 | 141 |
| Sheep for breeding | 130 | 136 |
| Bacon pigs | 106 | 119 |
| Milk | 177 | 176 |
| Cheese. | 95 | 112 |
| Butter. | 95 | 102 |
| Wool | 87 | 127 |
| Feeding stuffs | 87 | 114 |
| Fertilizers | 89 | 90 |
| Wages | 164 | 172 |

Before turning to a study of the information contained in diagram I, it should be stated that all the data sent in by the Scottish Department of Agriculture do not possess the same representative value, and care should be taken not to make hasty generalizations. This understood, it may be admitted that the farms which gave the best results in 1936-37 were those in the South-West, where dairying and stockbreeding predominate, and those in the North-East devoted to the rearing of livestock, although the number of individual farms which suffered loss was greater in this than in the other districts. This is because the increase in the prices of productive animals and of fatstock for slaughter led to a substantial increase in the turnover of stockbreeders and fatteners, and,

consequently, also in the receipts from subsidies granted for fattening livestock. On the farms in the North-East, where cattle rearing and fattening predominate, and on those in the same area where the dairy industry figures as the principal branch, (diagram I), the gross return, the net return and the social income increased considerably in 1936-37. This increase was much less pronounced on the Border farms where sheep rearing predominates. On the eastern farms, where arable cultivation and the fattening of cattle and sheep are particularly important, the gross return was seriously affected by poor crops and in 1936-37 did not exceed the level of the previous year. Labour costs in particular increased, while the net return fell.

From the point of view of the profits realized on total farm assets, however, it will be seen that the farmers' situation improved in 1937.

TABLE 7. — *Costs of Production, Gross Return and Profit or Loss on total Farm Assets in Scotland in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|---|--------------------|--------------|-------------------|--------------------|--------------|-----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | B |
| Farms in the north-east where livestock rearing and feeding predominate . . . | 14.69 | 16.28 | 111 | 15.44 | 19.02 | 123 |
| Farms in the east and southwest where dairying predominates | 18.94 | 24.42 | 129 | 21.62 | 28.25 | 131 |
| Border farms where sheeprearing predominates | 10.51 | 11.74 | 112 | 10.59 | 12.14 | 115 |
| Farms in the east where cultivation and the feeding of cattle and sheep predominate | 21.31 | 24.68 | 116 | 19.83 | 24.59 | 124 |
| Profit or loss on total farm assets | | | | | | |
| | £ per hectare | | % of gross return | | | |
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 | | |
| Farms in the north-east where livestock rearing and feeding predominate . . . | 1.59 | 3.58 | 9.77 | 18.82 | | |
| Farms in the east and south-west where dairying predominates | 5.48 | 6.63 | 22.44 | 23.47 | | |
| Border farms where sheep-rearing predominates | 1.23 | 1.55 | 11.70 | 14.64 | | |
| Farms in the east where cultivation and the feeding of cattle and sheep predominate | 3.37 | 4.76 | 13.65 | 19.36 | | |

A = pounds sterling per hectare.

B = per 100 pounds sterling of costs of production.

The average gross return on 50 *Devonshire* farms increased between 1935-36 and 1936-37 (diagram II). This increase was not, however, accompanied by a proportionate improvement in net return owing to the increase in expenditure on seeds, feeding stuffs, and manure. Labour costs remained the same. The rise in the prices of agricultural products was sufficient to increase the profit on total farm assets.

TABLE 8. — *Cost of Production, Gross Return, and Profit or Loss on total Farm Assets in Devonshire in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farm assets | |
|--------------------|--------------|-----|--------------------|--------------|-----|-------------------------------------|---------|
| Cost of production | Gross return | | Cost of production | Gross return | | A | |
| A | A | B | A | A | B | 1935-36 | 1936-37 |
| 15.81 | 16.72 | 106 | 16.78 | 18.35 | 109 | 0.91 | 1.57 |

A = pounds sterling per hectare.

B = per 100 pounds sterling of costs of production.

The farms under review are in *Northern Ireland*. A study of diagram II shows that the gross return did not improve from 1935-36 to 1936-37, that working expenses fell slightly and that the slight increase in net return did not prevent a decline, however small, in social income. The average profit on total farm assets remained at zero: in 1936-37, as in 1935-36, the gross return exactly covered the cost of production:

TABLE 9. — *Costs of Production, Gross Return, and profit or Loss on total Farm Assets in Northern Ireland in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farm assets | |
|--------------------|--------------|-----|--------------------|--------------|-----|-------------------------------------|---------|
| Cost of production | Gross return | | Cost of production | Gross return | | A | |
| A | A | B | A | A | B | 1935-36 | 1936-37 |
| 18.35 | 18.35 | 100 | 19.58 | 19.58 | 100 | 0 — | 0 — |

A = pounds sterling per hectare.

B = per 100 pounds sterling of costs of production.

Conclusion.

The situation of agriculture in the countries considered above may therefore be summarized as follows. The conditions of agriculture in Western Europe in 1936-37 differed considerably as between the different countries. Conditions

became worse in Denmark and Sweden; the situation in Northern Ireland remained stationary, while everywhere else conditions improved to a greater or less degree. The figures given below show the alterations which occurred between 1935-36 and 1936-37 in the gross return and profit or loss on total farm assets in the various countries under review.

RECAPITULATORY TABLE: *Variations between 1935-36 and 1936-37 in the gross return per 100 currency units of costs of production.*

| | Gross return per 100 units of costs of production | |
|--|--|---------|
| | 1935-36 | 1936-37 |
| Denmark, average | 99 | 93 |
| Sweden, average. | 102 | 101 |
| Norway, average | 95 | 95 |
| Northern Ireland | 100 | 100 |
| Switzerland, average | 89 | 92 |
| Overijssel (Netherlands), average | 77 | 89 |
| France: | | |
| a) Soissons | 96 | 101 |
| b) Etrépagne | 96 | 98 |
| Great Britain: | | |
| a) Devonshire | 106 | 109 |
| b) Scotland: | | |
| farms in the north-east where livestock rearing and feeding predominate. | 111 | 123 |
| farms in the east and south-west where dairying predominates | 129 | 131 |
| border farms where sheep-rearing predominates | 112 | 115 |
| farms in the east where cultivation and the feeding of cattle and sheep predominate | 116 | 124 |

For every 100 units of costs of production the highest gross returns were obtained in 1936-37 in Switzerland, Overijssel (Netherlands), Soissons and Etrépagne (France) and in Devonshire and Scotland (United Kingdom). On the other hand, the decline, relatively to the costs of production, of the gross return in Denmark and in Sweden had an adverse effect upon the economic position of the farmers in these two countries. The gross return did not increase in Switzerland, and the increase in the profits on total farm assets was due to the fall in production costs. As has been seen, no change occurred in the situation in Northern Ireland. Apart from these four countries, it may be said that the policy adopted by the Governments in Western Europe in favour of agriculture, the results of currency adjustments and the rise in the prices of agricultural products, increased gross returns in 1936-37 to such an extent that the position of farmers was considerably improved.

(to be continued).

J. DESLARZES.

CROP INSURANCE

SUMMARY: *Introduction.* The purpose of this first part is to outline the difficulties encountered in the introduction and conduct of insurance which aims at covering loss incurred from two or more forms of crop damage mentioned in the policy. — *Early forms of crop insurance.* The second part deals with early attempts to organize this form of insurance, which is of fairly recent date. — *Recent institutions.* The third part contains a study of the various forms of this kind of insurance in the different countries where it has already found practical application, namely, in Switzerland, Greece, France, Bulgaria, the U. R. S. S., the United States of America and Japan.

Introduction.

The form of insurance to be discussed in the present article, which, in several French legislative documents, has been called « *assurance [contre les calamités agricoles]* » consists in covering crops against risks deriving from several natural causes as specified in the insurance policy.

This form of insurance has been called *crop insurance* in America and *Elementarschädenversicherung (der Kulturen)* in Switzerland.

The following is a list of the various forms of damage due to natural causes: damage caused by hail, frost, drought, damp, excessive heat, water (floods, overflows), earthquake or landslide, by hurricane, avalanche, as well as by various infestations (crop disease and pests), etc. This form of insurance may also include fire risks.

The introduction of insurance against damage due to natural causes, which is of recent date, presents serious difficulties whose origin may be attributed mainly to the following factors.

In the first place, it has been emphasized that statistical data on damage due to natural causes are insufficient and in some cases are completely lacking. It is unnecessary to stress the consequences of this state of affairs upon the assessment of risk. Even in the case of hail insurance, which is the most highly developed branch of crop insurance, statistical data are still on the whole far from satisfactory. Some time must pass before enough experience has gradually been gained and elements are available for compiling precise statistics.

Another difficulty encountered in the introduction of this branch of insurance is due to the fact that it is sought only by those farmers who are most liable to this risk. It has been observed that the demand diminishes greatly, when damage occurs at long intervals or wherever it affects a small area: two characteristics which are generally inherent to damage due to natural causes. This phenomenon makes it very difficult to obtain sufficient actuarial compensation of the risks.

Another important obstacle to the exercise of this branch of insurance which has been pointed out consists in the fact that the damage for which compensation is sought varies considerably even from one normal year to another and is sometimes so widespread as almost to assume the form of a calamity.

Under these circumstances, insurance is faced with serious difficulties as regards assessment of the damage for which compensation is to be paid, as well as in collecting the sums required for compensating the losses ⁽¹⁾.

On the occasion of the meeting of the International Scientific Council of Agriculture of the International Institute of Agriculture in 1927, the agenda of the Commission for Agricultural Credit and Insurance included the discussion of the problem of general insurance covering all agricultural risks, with special reference to the problem of ascertaining whether it was technically possible to insure crops or agricultural holdings against the risks in question.

In a note attached to the agenda, it was stated that it was extremely difficult not only from the technical, but also from the practical standpoint, to introduce this form of insurance. Since it is extremely difficult to localize the dangers inherent to hail, drought, white frost and floods, it was thought that it would be necessary to fix very high premiums. It was added that in connection with insurance against frost and drought, which are the most frequent causes of a poor harvest, it would not be easy to establish what would have been the yield of the crop had these natural phenomena not occurred, nor to fix the percentage of loss to be attributed to one or other of these phenomena. As regards insurance against flood, mention was made of even greater difficulties in the case of this form of insurance due to the very serious character of the risk and because, as a rule, certain well-defined regions are particularly exposed to this risk.

On the conclusion of its proceedings, the Commission expressed the opinion that the introduction of this form of insurance appeared to be very difficult, especially on account of the limited amount of even approximate information available concerning the frequency, extent, gravity and localization of risks ⁽²⁾.

The possibility of the practical exercise of this branch of insurance must accordingly be sought in a limitation of the liabilities assumed. It has been said "that it must be realized that when speaking of insurance against damage due to natural causes, there can be no question, for an indefinite period, of covering in their entirety either the risks or the damages incurred. A guarantee of this nature would be far beyond the limits of the financial possibilities offered by this form of insurance. Nevertheless the certainty of being able to count, in case of disaster, on the existence of even a partial compensation would be of inestimable comfort to our winegrowers and farmers. It would therefore be necessary, at least at the outset, to establish a minimum compensation which might be claimed by the sufferers or else to establish a fixed margin of loss to be borne by the insured party for risks below a certain percentage, which should, however, not be too low" ⁽³⁾.

⁽¹⁾ ROMMEL C.: Grundlagen der Elementarschädenversicherung. *Zeitschrift für die gesamten Versicherungswissenschaften*, January 1937, p. 33.

LANZ-STAUFFER und ROMMEL: *Elementarschäden und Versicherung*. Bern, 1936.

⁽²⁾ ACTES DU CONSEIL INTERNATIONAL SCIENTIFIQUE AGRICOLE. Vol. I, pp. 109 and 127. International Institute of Agriculture, Rome, 1928.

⁽³⁾ LANZ-STAUFFER. In an article on crop insurance quoted in the *Rapport de l'Assurance Cantonale Vaudoise contre les dégâts de grêle, exercice 1938*. Lausanne, 1939, p. 2.

We will not however enter into a detailed discussion of the difficulties and possibilities inherent to this form of insurance.

The purpose of the present article is restricted to a concise description of the various institutions which existed or still exist and whose aim is to provide joint crop insurance against damage due to two or more natural causes.

As will be seen in the course of the present work, crop insurance has as a rule taken the form of State insurance. This is easily explained: the technical difficulties encountered by private concerns in the introduction of combined insurance against crop damage from natural causes are not an insurmountable obstacle for the State, whose main object is to render assistance to farmers who are often seriously affected by damage to their crop, damage which is often so widespread that it may almost be considered a calamity. Moreover, the results obtained so far by private insurance in this particular field of activity make it increasingly clear that this form of insurance should be organized by public authority.

First attempts at joint crop insurance.

The first attempt of joint crop insurance for which information is available concerns the « Caisse générale des assurances agricoles » which, founded in *France* as a limited mutual insurance company accepting fixed subscriptions against loss from damage by hail, frost, flood, livestock mortality and fire, was chartered by decree of December 30, 1858.

The establishment of this institution was preceded by a draft decree which contemplated the creation of a bank for the purpose of granting compensation to farmers in consideration of an annual voluntary subscription for loss to their crops and livestock caused by hail, frost, flood or animal disease. But when the draft decree was submitted for approval, the Council of State vetoed the creation of the bank stating « that immense danger would accompany all official interference in the insurance industry ».

The « Caisse générale des assurances agricoles » mentioned above, whose operations were subject to Government control, had originally enjoyed administrative facilities granted by the Government, which were, however, gradually withdrawn shortly afterwards. Thus in 1862 the « Caisse » became an ordinary insurance company under the name of « Caisse générale des assurances agricoles et des assurances contre l'incendie ». The branches dealing in insurance against flood and frost were abolished and in 1889 the company was liquidated ⁽¹⁾.

In *Finland* a mutual insurance company was created in 1860, which offered its members compensation for loss incurred to standing crops, meadows and mown hay from hail, storm, flood, thunderbolt or soil subsidence. This company was very short-lived ⁽²⁾.

In *Germany* about 1870 a mutual insurance company was founded under the title of *Die deutsche landwirtschaftliche Gesellschaft für Vieh-Hagel- und Frost-*

⁽¹⁾ HEMARD: *Théorie et pratique des assurances terrestres*, Paris, 1924. 1st part, p. 213.

⁽²⁾ LANZ-STAUFFER und ROMMEL, *op. cit.*, vol. I, p. 112.

schäden, the purpose of which was to offer insurance against livestock mortality, hail and frost. No further information is available concerning this company.

In 1885 the *Ceres* mutual insurance company granted insurance against the risks of frost and hail, but the branch handling frost risks was abolished five years later ⁽¹⁾.

In the *United States of America* a private company was formed at Minneapolis in 1899 for the purpose of insuring crops against loss due to natural causes; no further information concerning this institution is available ⁽²⁾.

Insurance against storm, hail, flood and the rise of waters was undertaken in 1910 in Denmark by the *Hagelskadeforsikringsselskabet af 1910*, a mutual company whose headquarters were in Aarhus. Flood insurance covered all objects suffering damage from these causes. Hail insurance covered damage only to crops which were not insured against damage from storm and rising waters. This company seems to have done little business in the branch of insurance against rising waters and floods. Only the hail insurance branch remained active ⁽³⁾.

Fire insurance companies in the *United States of America* introduced three different forms of crop insurance in 1917, 1920 and 1921.

The first form, exercised in 1927 in the States of North and South Dakota and Montana, covered the principal risks to which crops are exposed, excepting fire, flood, winter frosts and the negligence of farmers, to an amount in dollars fixed in advance. The compensation offered by the company in cases of total crop failure amounted to the full insured value. In the event of partial destruction, the company undertook to pay the insured person the difference between the policy value and the value of the crop harvested, this latter value being calculated on the basis of prices fixed in advance in the policy.

The companies operating this form of insurance were only able to fulfil their engagements to a limited extent, owing in part to the drought which affected large areas, and in part to imprudent conduct of their business by the companies themselves.

Another form of insurance introduced in 1920 covered the farmer against all the principal risks to which crops are liable, with the exception of fire, hail, wind, tornado, failure of seed to germinate, or want of proper care at the time of sowing, cultivation or harvesting. The amount of the insurance was established on the basis of a flat rate covering the cost of each separate proceeds involved in crop production plus a fixed amount for seeds and rental value of the ground.

In the event of partial loss, the company paid compensation equal to the difference between the policy value and the value of the crop harvested. This was not established in advance, as in the case of the policy described above,

(1) ROMMEL: L'assurance contre la gelée, reprint from the *Revue générale des assurances terrestres*, No. 1, 1938.

(2) ARCOLFO: Crop insurance in the United States of America. *Monthly Bulletin of Agricultural Economics and Sociology*, March, 1939. International Institute of Agriculture, Rome.

(3) LANZ-STAUFLER und ROMMEL, *op. cit.* vol. I, p. 87.

but was calculated on the basis of the market price on the date when compensation was paid. Consequently, this form of insurance covered the farmer not only against crop damage, but also against a decline in the price of the product insured.

The insurance companies suffered very severely from a sharp fall in prices.

A new form of crop insurance was introduced in 1921 covering the same risks as under the above system, but fixing the insured value at a certain percentage of the policy holder's average crop for the five years immediately preceding, the percentage being calculated in dollars on the basis of current prices during the same period. Under this system the company undertook in the event of total loss to compensate the farmer for three-fourths of the cost of the field operations completed on the date when the damage occurred: but the compensation was not to exceed three-fourths of the total insurance carried, nor the cost of replacing all or part of the average crop with good quality products of the same kind, nor was it to exceed the margin, if any, between the market value of the crop harvested and the amount insured. This last clause enabled the company to take advantage of variations in the price of products in either direction.

The contracts made in the years following 1921 applied only to fruit and market garden produce, and the value of produce insured soon became quite insignificant ⁽¹⁾.

In 1930 a small Kansas company undertook crop insurance covering farmers against loss both on yield and on the prices of their products; a sharp fall in prices involved the company in heavy losses.

It appears that the failure of these attempts made in the United States was due in large measure to the lack of adequate actuarial data and of capital, to the limited areas to which insurance schemes were applied and to an attempt to insure not only against loss on yield but also against price fluctuations ⁽²⁾.

Another important attempt at joint crop insurance was introduced in *Bavaria* by the Bavarian Chamber of Insurance.

In 1919 the State Hail Insurance Institute introduced insurance against frost, covering the same products as those covered by hail insurance, with the exception of garden produce, fruit and fruit trees, as well as nursery orchards and vineyards. This insurance was offered against fixed premiums; additional premiums were not allowed. Exemption amounting to 1/10 was made applicable to all damage. From 1921 on, this restriction of compensation was abolished so that all damage exceeding 1/10 of the insured capital was paid in full with a reserve allowing a possible reduction of compensation whenever this was rendered necessary by the unsatisfactory results of business in any given year; this reserve was not valid if policy holders made a contract excluding any reduction of compensation.

⁽¹⁾ ARCOLEO, *op. cit.*

⁽²⁾ SHIELDS AND DONOHU: All-risk crop insurance in the United States of America under the Federal Crop Insurance Act of 1938. *International Bulletin of Agricultural Law*, 1940, No. 1, p. 4. International Institute of Agriculture, Rome.

During 1924 frost insurance was combined with hail insurance. All products of the soil, including tobacco, vines and hops, which were insured against hail, were also insured against frost without any additional premium. In the case of products of the soil, including tobacco and hops, the insurance was extended to cover damage from late frosts after May 15 in normal years and after May 1 in years of early growth; it was extended also to damage from early frosts occurring before October 15 in normal years, or else before November 1 in seasons when growth was retarded. As regards vines, this insurance was extended to damage by frost to unopened buds, young shoots and leaves, but compensation was allowed in this case only for damage exceeding one-fifth of the insured capital.

In 1926, the initial date for the application of frost insurance was fixed definitely on May 15, without regard to the growth of the crops in question. During this year the frosts were exceptionally serious, lasting until the end of May, and consequently no compensation was paid for part of the loss incurred.

In 1927 frost insurance was again separated from that for hail, and covered products of the soil, including hops and tobacco, as well as damage caused by late frosts occurring after May 1 and early frosts before November 1 (for potatoes the date fixed was September 10). In the case of vines the insurance covered damage from frost after March 15 to the unopened buds and green shoots (leaves and flowers). The premium was fixed at 1 RM per 100 RM insured capital in the case of products of the soil as a whole, at 2 RM for hops and tobacco and at 3 RM for vines. No additional premiums for insurance against frost were fixed.

In bad years the amount of compensation paid was restricted to the funds available ⁽¹⁾.

The first years during which this branch of insurance was exercised showed good results, but as time went on heavy losses made it necessary to reduce the amount of compensation offered.

When hail insurance was reorganized in 1930, frost insurance was abolished ⁽²⁾.

(to be continued)

F. ARCOLEO

INTERNATIONAL CHRONICLE OF AGRICULTURE

BULGARIA

During the first four months of 1939 the business situation was characterised by a reduction in exports, industrial production and domestic trade turnover. This, however, was not due to unfavourable business conditions, but to other causes. The most important of these consisted in the expectation that the unfavourable spring crop in 1938 will decrease the purchasing power of the farmers during the first months of 1939; and in the accelerated export of tobacco at the end of 1938, which reduced the tobacco export at the beginning of 1939.

(1) *Geschäftsberichte der Bayrischen Versicherungskammer für 1918 bis 1929*, p. 39. München.

(2) ROMMEL: *L'assurance contre la gelée*, already quoted.

The bad spring crop in 1938 was compensated by a very good winter crop, especially of wheat, during the same year and by the rise in the prices of tobacco and other agricultural products. This, together with the expectation of a good 1939 crop, which proved fully justified, and the increased activity of the building industry in 1939, the value of which was 30 % higher than that of the same period of 1938, created an economic boom during the four months preceding the war. During the same period the value of exports increased on the average by 38 % per month compared with the same period of the preceding year. On the other hand, industrial production for the same period increased by about 12 %, and the retail sales of the urban and rural co-operative stores by 9 %.

The beginning of the war in the autumn of 1939 caused considerable disturbance in the economic life of the country. The value of exports during the last four months of the year rose considerably, because of increased demand on the foreign markets. The value of imports, however, diminished during the same period, mainly on account of the reduced supply of raw materials and semi-manufactured goods. This influenced the development of the industrial production in the country by reducing the high rate of activity, which distinguished the preceding period. Along with this, the upward tendency of domestic trade was checked.

Credit conditions were also affected by the disturbances caused by the war. The commodity prices tended to rise. During the last four months of the year the prices of imported goods rose much quicker than those of exported goods, while during the first eight months the reverse tendency was observed.

The general index of wholesale prices for 1939 was only 1.8 per cent. higher than that for 1938, though there were significant differences in the relationships between the prices of various groups of commodities. During the last four months of the year out of 73 commodities included in the general index of wholesale prices, the prices of 45 have increased, of 15 remained unchanged and only in the case of 5 commodities they fell. The general index of wholesale prices during the same period rose from 120 to 127, while during the same period of 1938 it remained unchanged. The marked rise of prices at the end of 1939 under the influence of the war would have been greater, if the government had not taken measures in order to prevent prices from rising above the level of August 30th, 1939.

During the first two months after the beginning of the war the withdrawal of the deposits increased, which brought about a contraction of credit. Soon, however, part of the withdrawn deposits were returned back to the credit institutions, and the credit situation improved accordingly.

A number of changes took place also in the evolution of Bulgaria's foreign trade since 1939. The most important changes were the following: The total value of the foreign trade (exports and imports) amounted to 11,261,000,000 leva in 1939—an increase of 750,000,000 leva, or of 6.8 %, above the 1938 figure. This increase was due to an increase of exports by about 487,000,000 leva and an increase of imports by 263,000,000 leva. The value of exports amounted to 6,064,000,000 leva and was 8.7 % higher than in 1938. The increased value of exports is due mainly to the rise in the prices of exported goods, their quantity being practically the same as in 1938. The higher value of imports is due to an increase in both prices and quantity. The active balance of trade during 1939 is 868,000,000 leva against 645,000,000 leva in 1938.

The change in the composition of exports during 1939 compared with that of 1938 was not great. The total increase in the value of exports was 487,000,000 leva. This increase in the total is due to the increase of the export of fresh and canned fruit by 204,000,000 leva, of tobacco by 122,000,000 leva, of oil seeds and oil cake by

115,000,000 leva and of eggs by 75,000,000 leva. The exports of grain and poultry during the year diminished by 80,000,000 and 61,000,000 leva respectively. An insignificant decrease took place in the export of furs. The diminution in the exports of certain goods, however, was compensated by increases in those of some other products, such as: sunflower oil, cocoons, different herbs, roots and various other products, which tend to acquire greater importance in the composition of Bulgarian exports.

The imports in 1939, compared with those of 1938, showed a decrease of about 149,000,000 leva in raw materials and semi-manufactured goods. At the same time the value of imports of manufactured and consumption goods increased by 277,000,000 leva and 135,000,000 leva respectively.

Trade policy.

According to the regulation of June 4th, 1937, concerning the foreign trade of the country, as amended on August 23rd, 1939, imports and payments of foreign debts are subject to control and to licensing by the Bulgarian National Bank. In the case of the free exchange countries, with which Bulgaria has no trade agreements, 75 % of the foreign exchange received against exports to these countries must be sold to the Bulgarian National Bank. For all other countries there are different regulations concerning compensations, clearings and the portion of the foreign exchange which must be sold to the Bulgarian National Bank. These regulations differ according to country and product. On March 9th, 1940, an addition was made to this order to the effect that imports from, and payments of foreign debts to, all countries will in future have to be authorised by the Bulgarian National Bank and mainly paid by means of clearings and compensations.

The Bulgarian National Bank buys all free foreign exchange, including that which has to be sold to it under the regulations, with a premium of 35 %, and sells it, when such sale is permitted, with the same premium plus 1/2 % commission.

The balance of foreign exchange which remains at the disposal of the exporter is also handed over to the Bank, which puts it to the credit of the exporter's compensation account.

The necessity of a complete regulation of the foreign trade made it necessary (besides the control of the market of foreign exchange on the part of the Bulgarian National Bank) to continue the already existing system of control of a large part of the products exported as regards their standards of quality and packing; to begin to advertise Bulgarian export goods abroad; to organize an information service for the foreign markets and to facilitate the export in every respect. All these functions are entrusted to the so-called Export Institute and to a special section at the Ministry of Commerce, Industry and Labour. In order to achieve closer contact and better results it is now proposed to set up a special Board of Foreign Trade under the Ministry of Commerce, Industry and Labour.

Because of the changes in economic conditions during 1939, new trade and clearing agreements were concluded and the old ones continued, with the necessary modifications, with the following countries: England, Switzerland, Roumania, Italy, Germany, Hungary, the Protectorate of Bohemia and Moravia, Yugoslavia, Estonia, the U. S. S. R., and Spain.

Measures relating to the marketing of agricultural products.

The main object of the policy concerning the internal market of farm products is: to guarantee reasonable prices for farm products in order to encourage their production and to maintain the purchasing power of the farmers at a reasonable level. Follow-

ing this policy the *Grain Board* was established (nearly a decade ago) for the purchase and export of cereals on behalf of the State. The Board was also authorized to monopolise the trade in some of the farm products on the domestic market, while acting as a common buyer on the market for some other commodities. In both cases the products are bought from the farmers at fixed prices. During 1939-40 the Grain Board has the complete monopoly as a buyer of wheat, rye, cotton, sunflower, barley, oats, and wool. The monopoly of wheat, rye and cotton has been in operation for several years, while the monopoly of sunflower, barley, oats and wool was established at the beginning of 1940. Besides the above mentioned products the Grain Board can buy at fixed prices from the producers hemp and linen fibre, and lately castor oil seeds, in unlimited quantities.

Besides the Grain Board, the *Bulgarian Agricultural and Co-operative Bank* has also the right to buy on account of the State the crops of cocoons, and certain quantities of tobacco.

The prices of cotton and cocoons of the 1940 crops are determined as follows: cotton, graded into three qualities, will be bought at 30-45 leva per kilogram compared with 26-36 leva per kilogram for the crop of 1939; cocoons will be bought at 46-75 leva per kilogram according to grade and quality, which means an increase of 8-13 leva per kilogram compared with the prices for the 1939 crop.

Measures relating to agricultural production.

The present policy for the improvement of farm production has been in operation, for the last ten years or so. This policy seeks to increase the area of the crops which absorb more labour and enjoy better prices and a steadier demand on the home and foreign markets. Special consideration was given to the production of wheat, rye, forage crops, cotton, linen, hemp, tobacco, sunflower seeds, soja-beans, potatoes, mangold various types of fruit, grapes, strawberries, vegetables, etc. Together with the efforts for increasing and diversifying vegetal production, measures were also taken for the development and improvement of animal husbandry: horses, cattle, pigs, sheep, poultry, etc.

The main purpose of this policy during 1939-40 was to encourage the increase by the farmers of the area devoted to the above mentioned crops; to improve the quantity and quality of the live stock, and also to raise the technical standards of farming, in order to increase the production per unit of farm area and per head of live stock, as well as to reduce the costs of production of farm products.

In order to insure rapid effects to this policy, the farmers were supplied with improved seeds at low prices or in exchange for part of the crop grown. Thus large amounts of seeds were distributed to the farmers, mainly wheat, rye, alfalfa, esparsette, mangold, Bologne hemp, linen seed, potatoes (of the "Binte" variety), and large numbers of fruit seedlings produced in the State fruit nurseries, of vegetable seeds controlled by the experimental stations, of seeds of the best varieties of tobacco from the tobacco experimental stations and fields, etc. were also distributed. These seeds were distributed by the Bulgarian Agricultural and Co-operative Bank, the Grain Board, and the Ministry of Agriculture and Public Domains. Most of these seeds were produced in the country and only a small amount of them was imported.

The farmers were also supplied with the necessary farm equipment, for which they were permitted to pay on a five years' instalment scheme without interest. Special credits were given for the building of tobacco drying sheds, of buildings for the storage and drying of fruit and of dairies, refrigerating houses and wine cellars, as well as for buying equipment for the manipulation of raw linen and hemp. Details of these

measures for the improvement of farm production, fixed by special laws, regulations and orders for the first half of 1939, were given in the preceding report.

In December 1939 a special law was passed for the regulation of the Bulgarian wine trade, including the establishment of definite standards of quality of the different Bulgarian wines, so that only high-grade products should be placed on the markets.

The improvement of animal husbandry in 1939-40 in general was done according to plan and involved mainly the control of the productive qualities of farm animals and the granting of premiums to farmers for the raising of high quality breeds; the annual examination of the male animals and the granting of prizes to the best; the financing of the purchase of high quality male animals by the communes; the development of breeding of high-class breeding stock in the State Animal-Breeding Stations, as well as by private breeders; the promotion of the use of the cows as work animals on the smaller farms; live-stock feeding demonstrations in selected villages and farms; the financing of the building of stables in the communes; the development of veterinary assistance in the country, etc.

Moreover, a special order of September 12th, 1939, amended in March 1940, prohibited the slaughter of calves and buffalo-calves of less than 200 kilograms liveweight for the plain regions, 150 kilograms for the sub-mountainous regions, 120 kilograms for the mountainous regions and under 100 kilograms for the dairy farms near the cities. It is also prohibited to slaughter pigs up to 60 kilograms liveweight and kids and lambs up to 8 kilograms liveweight.

An order of September 13th, 1939, decreed two meatless days a week, namely Wednesday and Friday.

Other significant features of the agricultural policy of the Bulgarian Government are: land irrigation and drainage, consolidation of scattered agricultural holdings, provision of land for the landless, and internal colonization.

The first of these measures aims to the more efficient use of the available water supply for irrigation and for the production of water-power (electricity, water-wheels, etc.). It involves the draining of marshes and ponds in order to obtain new farm land; the correction of river beds and the building of protective dams in order to prevent the flooding of the arable land. These enterprises are financed by the State, as well as by the private water syndicates. From 1918 to 1938 the following work in this direction was done: 139 kilometres of river-beds were corrected, which preserved nearly 70,000 decares of arable land; 248,000 kilometres of protective dams and canals were built, which have preserved and drained 412,000 decares of arable land; 4,200 kilometres of irrigating canals were built and equipped making possible the irrigation of 277,212 decares of arable land. Water power centrals of a capacity of 4,440 H.P., for the supply of about 5,230,000 k.v. hours electric power, were built and equipped. In 1939 the country was divided into irrigation districts, and irrigation canals were planned over an area of 424,000 decares; projects were made for the irrigation by gravity of an area of 87,000 decares and for the irrigation by pumps of an area of 64,000 decares. Projects for the draining of certain marshes and a number of projects for the correction of river-beds were also inaugurated.

The consolidation of scattered holdings, which is of great importance for Bulgarian agriculture, was carried out in 1939 with increased energy. According to the statistics at present available, up to the end of 1938, the consolidation of holdings was carried out in 23 villages, with a total area of 983,113 decares. Moreover, consolidation plans for 10 villages, including the necessary improvements of their land, were completed. Along with this, a new land valuation was made, new roads were projected over the lands of 14 villages, and the cadastre plans of 37 villages were completed.

Special measures were taken for the provision of land to the landless agricultural population and for the transfer of population from poor regions to the more fertile parts of the country. A special land fund was created to which was assigned a part of the available public lands such as State lands not used for other purposes, communal pastures, State forests, etc., as well as ownerless lands. In spite of the fact that the possibilities of action in this sense are very limited, 115,102 decarees of land were added in 1939 to the land fund and distributed to 8,055 farm families.

Work of public and private agricultural organizations.

The recently formed Agricultural Chambers, after a period of reconstruction, in 1939 began their normal activity. Their representatives took part in the Council of the Export Institute, in the Commodity Exchanges, and almost in all committees appointed by the different Ministries, and participated in the discussion of a number of agricultural and economic problems. Every Agricultural Chamber made an economic survey of its region in order to determine its needs and the possible measures of improvement. Part of these measures concerning the prices of farm products and their supply, the encouragement of certain branches of farm production, etc. were considered in detail by the representatives of all the Agricultural Chambers.

The Agricultural Chambers also helped financially to the limits of their power in the raising and improvement of the main branches of agricultural production, thus co-operating with the Ministry of Agriculture and Public Domain in the carrying-out of its agricultural policy.

The Farm Union, which represents a great number of farmers in the country, during 1939 made a great progress in its organizing activity and continued its work on numerous social and economic schemes. It also defended the professional interests of its members.

Agricultural co-operation.

The agricultural co-operation continued its activity during 1939, granting credits to farmers, collecting and processing raw farm products, organizing the sale of farm products and the supply of goods necessary for the farm and the farmer's household. The co-operative organizations managed co-operative dairies and wine cellars; they acted as agents for the Grain Board and the Bulgarian Agricultural and Co-operative Bank in buying the commodities subject to monopoly, such as wheat, rye, cotton, etc.; they collected and sold the products not subject to monopoly - eggs, tobacco, wool, etc.; they supplied different farm instruments, equipment and other means of production as well as groceries and other goods for the farmers' households.

Attempts were recently made for the co-operative cultivation of the lands of individual farmers. The practical value of this new initiative, however, has to be carefully studied before it can be applied on a larger scale.

All the initiatives of the farm co-operatives mentioned here are carried out with the financial assistance and guidance of the Bulgarian Agricultural and Co-operative Bank.

Agricultural credit.

The farms are provided with the credits necessary for their normal activity by the Bulgarian Agricultural and Co-operative Bank, either directly or through the farm credit co-operatives. At the end of 1939 the Bank advanced directly against bills, warrants,

mortgages and other securities about 1,377,273,321 leva, while the advances made through the farm credit co-operation amounted to 2,374,724,663 leva.

The credit policy of the B. A. C. Bank aims to guarantee the normal development of agriculture by providing the necessary financial facilities for the purchase of means of production; by encouraging and helping the production of more profitable crops; by facilitating the introduction of permanent improvements on the farm; by helping co-operative initiatives in the processing and sale of agricultural products, etc. Along with its purely credit functions, the B. A. C. Bank assists the Ministry of Agriculture and Public Domains in increasing and improving the production of certain intensive crops; in the improvement of animal husbandry; in providing the farmers with equipment and improved seeds, and in keeping the prices of agricultural products on a remunerative level, by means of the purchase of such products at fixed prices.

Agricultural insurance.

The hail-insurance in Bulgaria is carried out by the Bulgarian Agricultural and Co-operative Bank and by special co-operatives. In 1939 a considerable increase of such insurances was observed. The number of farmers who contracted for hail-insurance has increased from 209,981 in 1938 to 236,897 in 1939, while the insured capital has increased from 1,488,851,600 leva to 1,775,354,260 leva. During the same year the Bank has paid compensation to 36,949 farmers to the total amount of 37,593,325 leva.

Live-stock insurance has also developed in 1939. The number of insurance co-operatives increased from 2,716 in 1938 to 2,824 in 1939 and the membership from 159,915 to 187,840. The insurance capital has increased from 974,644,880 leva in 1938 to 1,178,656,360 leva in 1939. During the past year compensation was paid for 9,048 farm animals, to the total amount of 19,527,378 leva.

In order to encourage the development of hail and live-stock insurance, the Bulgarian Agricultural and Co-operative Bank reduces the interest rate on its advances against bills, warrants, and mortgages by 1 % to all farmers who conclude farm insurances.

Social policy.

The State takes care of the improvement of the housing, health, diet, and clothing of the rural population by teaching and educating the rural children in kindergartens and schools, educating the adult farm population, improving the farm home, improving the diet and clothing, etc. The most important measures in this respect consist in the provision of doctors and midwives in the villages, of summer kindergartens, of agricultural advisors and house-keeping specialists; of agricultural schools; of special small workshops for canning vegetables and fruit for home needs; of public ovens and baths; of courses for training the rural housewives; of demonstrations of cooking and of management of the village home; of demonstrations and advice concerning cheap and hygienic home-made clothing, the bringing-up of children, etc.

The measures for the improvement of village housing, diet, clothing, health of the farm population, etc. are carried out through the staff of the so-called agricultural continuation schools of domestic economy, which consists of agronomes and home making specialists. These schools have a two years winter course for village boys and girls, to whom elementary training is given in both agricultural and domestic economy.

Bulgaria has 210 agricultural continuation schools of domestic economy, supported by the State and the communes. The staff of these schools, besides teaching, is also entrusted with extension work in the villages. The results of the work done by these schools up to date are very encouraging, owing to which their number is constantly increasing and is bound to increase in the future.

TH. BAKARDJIEFF

BRAZIL

It is not easy to give a general view of Brazilian economy and it is especially difficult to summarize its agricultural characteristics in a few comprehensive words. Agriculture has been seriously affected by the war and unexpected developments may make it necessary to adopt an entirely new course. Coffee exports, for instance, which form a large proportion of total exports, amounted to 40 per cent. of the total value in 1939 and made satisfactory progress throughout last year, attaining a record figure in November. Other agricultural products were easily placed on the market, cotton fetching high prices. The countries engaged in war, as well as those which remained outside the conflict, all sought to obtain supplies as long as shipping was available, and Brazil consequently did a lively trade in most products. Changes have, however, occurred meanwhile, in spite of optimism in Brazilian circles, where it was hoped to find outlets in other continents. Attention was turned in the first place to the South American continent and the "Comissão de Defesa da Economia Nacional" was formed to centralise exports of agricultural products and at the same time to stimulate home industry which has been showing satisfactory progress for some time past. Among the products exported preference is given to textiles, ceramics, simple machinery, steel products and leather goods (shoes).

Considerable attention has been paid to the encouragement of metallurgy and heavy industries in order to render their operation efficient. A national company is about to be created on the initiative of the President of the Brazilian Federation, Getulio Vargas. One-third of the capital will be subscribed by Brazilian capitalists, the remainder by the State and by a few capitalists interested in the metallurgical industry in North America. These measures were adopted when the Itabira concession was annulled by the Government.

Plans have been prepared for the erection in the neighbourhood of Rio de Janeiro of blast furnaces with an annual output of 300,000 metric tons of steel. The coal used for melting the iron will be supplied by Brazilian mines (65 per cent.) and by the United States (35 per cent.). The initial capital amounts to 35 million United States dollars. The President has appointed a commission, of which he is chairman, for the execution of this programme, by means of which he hopes to protect national interests against foreign capitalists. The principal products turned out by the establishment will be rails, every shape of structural iron, metal plates and sheet iron.

The new metal industry will exploit the rich iron deposits in the State of Minas Geraes, while the necessary coal will be supplied chiefly by the State of Rio Grande do Sul. A difficult problem is that of recruiting sufficient skilled labour to run the foundries. Workers will have to be taken from local farming and this will have an unfortunate effect on field work; consequently landowners find that enterprises of this description are not an unmixed advantage.

In the opinion of experts Brazil's iron ore deposits are among the richest in the world; several hundred millions tons of ore can certainly be extracted from the mines.

It is estimated that the initial output of the mines will amount to 300,000 tons, sufficient to replace imports, while it is expected that production will increase to such an extent as to enable Brazil to supply the other South American countries with steel and iron products. Brazil will thus become the foremost industrial country in South America. The elimination of large steel imports will also have a very favourable effect on the country's trade balance.

The President has other projects in the field of self-sufficiency which will certainly have beneficial effects on the trade balance. One of the chief of these is the exploitation of the petroleum resources which have been definitely located in several parts of the country (Acre, Alagoas, Bahia). Drilling operations have already commenced at Lobato (Bahia), the daily output at the present time being limited to 120 barrels (24,000 litres). Further borings will be undertaken shortly.

In order to meet all the country's requirements and to ensure the steady progress of the various enterprises, Brazil has worked out a five-year plan which has been in operation for a year. Estimates for expenditure during the second year, involving the same amount as for the previous year, are as follows: 15,000 contos for petrol drilling operations, 50,000 for the iron industry (representing the total share of the Brazilian Government in the comprehensive economic plan for five years), 50,000 for the War Ministry and 30,000 for the Ministry of Marine, 20,000 for agriculture, 25,000 for education, 130,000 for the improvement of means of communication; while 270,000 have been placed at the disposal of the Ministry of Finance to be appropriated for non-specified projects. No report has as yet been published concerning the first year's activities.

Foreign trade.

Brazilian foreign trade has registered serious fluctuations during the past decades; with the exception of a few isolated years, exports were considerably in excess of imports.

Brazilian foreign trade from 1904 to 1939.

| Year | Value in £ 1000 gold | | Surplus exports |
|---------------------------|----------------------|---------|--------------------|
| | Imports | Exports | |
| Average 1904-08 | 32,994 | 47,093 | 14,099 |
| " 1909-13 | 53,685 | 66,751 | 13,066 |
| " 1919-23 | 59,404 | 74,005 | 15,141 |
| " 1924-28 | 79,425 | 93,996 | 14,571 |
| " 1929-33 | 43,981 | 56,508 | 12,527 |
| " 1934-38 | 31,898 | 37,159 | 5,261 |
| 1939 | 31,801 | 37,298 | 5,497 |
| Average 1904-39 | 46,147 | 59,258 | 13,111 |

Taking the results for 1919 as 100, the index of imports for 1939 is 44.2, the index of exports being 31.7. It is therefore not astonishing that, with trade reduced to such an extent, great difficulties are encountered in the payment of interests on the foreign debt. The Brazilian Federal Government has, however, promulgated a law

decreeing the resumption of payments on the foreign debt from April 1, 1940. This law was the result of prolonged negotiations with creditors in the United States, Great Britain, France and Portugal. The payments of the debt on the Aranha plan, which were interrupted in 1937, will be resumed as from April, 1940, the amount of the payments being reduced by one-half. Payments will at first be used to cover the interest due and the quotas of the redemption fund which have fallen due since November, 1937; the object is to guarantee the regular service of the debt. As a result of the 50 per cent. reduction in the interests and the annual quotas of the redemption fund contemplated in the Aranha plan, the annual payments to be made by Brazil during the four years following April, 1940, will fluctuate between 4.14 and 4.3 million pounds sterling. The interest charge amounts to 1 per cent. of the nominal value of the debt.

The following table shows the distribution of Brazilian exports according to groups of commodities:

*Distribution of Brazilian foreign trade according to products
for the years 1938 and 1939.*

(Value free on board at Brazilian port in £ 1000 gold)

Exports.

| | 1938 | 1939 | | 1938 | 1939 |
|--|-------------------|-------------------|---|-------------------|-------------------|
| <i>Live stock</i> | 2 | 1 | maize | 317 | 150 |
| | <u> </u> | <u> </u> | bananas | 187 | 359 |
| <i>Raw Materials:</i> | | | Brazil nuts, shelled . . | 168 | 167 |
| skins and hides | 1,474 | 1,033 | oranges | 794 | 792 |
| tallow and grease . . . | 37 | 24 | other dessert fruits not specified | 40 | 46 |
| other raw materials of animal origin | 136 | 168 | sugar | 20 | 156 |
| rubber | 329 | 377 | cocoa seeds | 1,502 | 1,494 |
| carnauba wax | 712 | 802 | coffee (raw) | 10,192 | 14,892 |
| castor seed | 503 | 636 | maté leaves | 419 | 420 |
| cotton seed | 105 | 87 | vegetable food stuffs not specified | 23 | 63 |
| Brazil nuts, in shell . . | 332 | 270 | frozen and chilled meat | 621 | 673 |
| babassu nuts | 272 | 399 | preserved meat | 444 | 791 |
| oil producing fruits, not specified | 57 | 56 | meat products | 16 | 14 |
| tobacco | 603 | 643 | lard | 29 | 116 |
| timber | 542 | 731 | food stuffs, not specif- ied | 19 | 66 |
| vegetable oils | 430 | 456 | <i>Fodder:</i> | | |
| other raw materials of vegetable origin | 208 | 212 | bran | 386 | 193 |
| ores | 575 | 834 | oil seed cakes | 598 | 564 |
| raw cotton | 6,559 | 7,645 | feeding stuffs, not spe- cified, for animals . . | 29 | 32 |
| wool | 285 | 183 | | | |
| other raw materials . . | 256 | 258 | | | |
| | <u> </u> | <u> </u> | <i>Total</i> | 22,341 | 21,572 |
| <i>Total</i> | 13,475 | 15,414 | | <u> </u> | <u> </u> |
| | <u> </u> | <u> </u> | <i>MANUFACTURED GOODS</i> . . | 127 | 311 |
| <i>Food stuffs:</i> | | | | <u> </u> | <u> </u> |
| beverages | 1 | 1 | <i>TOTAL EXPORTS</i> | 35,945 | 37,298 |
| rice | 276 | 299 | | <u> </u> | <u> </u> |
| tapioca | 18 | 9 | | <u> </u> | <u> </u> |

Imports.

| | 1938 | 1939 | | 1938 | 1939 |
|---|--------|-------|---|--------|--------|
| <i>Live stock</i> | 147 | 203 | <i>Food stuffs:</i> | | |
| | | | olive oil | 304 | 214 |
| <i>Raw materials:</i> | | | olives | 50 | 62 |
| cement, coal, etc. | 2,985 | 2,555 | codfish | 278 | 259 |
| iron and steel | 993 | 845 | beverages | 238 | 242 |
| petrol and mineral oils | 2,688 | 2,532 | malt | 178 | 109 |
| jute. | 404 | 405 | wheat flower. | 403 | 476 |
| wool | 314 | 322 | fruits and nuts | 233 | 117 |
| hops | 40 | 52 | wheat | 3,710 | 2,263 |
| wood pulp for manu- facture of paper | 651 | 532 | <i>Total</i> | 5,663 | 4,003 |
| skins and hides | 149 | 143 | | | |
| animal silk | 265 | 167 | <i>Manufactures:</i> | | |
| sundry raw materials | 1,795 | 1,918 | machinery, motor-cars, chemical products | 19,772 | 18,124 |
| <i>Total</i> | 10,344 | 9,471 | <i>TOTAL IMPORTS</i> | 35,916 | 31,801 |

Exports of non-agricultural commodities (mineral products and manufactured goods), represented only 2 per cent. of the total in 1938 and 3 per cent. in 1939. Brazil is still a purely agricultural country and consequently her imports of agricultural products, with the exception of wheat and wheat flour, are extremely small.

Since Brazilian exports have been hampered by the European war, it is interesting to note the distribution of Brazilian trade among the continents.

Distribution of Brazilian foreign trade by continents

(Value in £ 1,000 gold)

| | Exports to | | | | Imports from | | | |
|-------------------------|------------|--------|--------|--------|--------------|--------|--------|--------|
| | 1938 | | 1939 | | 1938 | | 1939 | |
| | Value | % | Value | % | Value | % | Value | % |
| Africa | 460 | 1.28 | 500 | 1.34 | 115 | 0.32 | 131 | 0.41 |
| North America | 12,505 | 34.79 | 13,717 | 36.78 | 10,480 | 20.20 | 12,332 | 38.78 |
| South America | 2,251 | 6.26 | 2,679 | 7.18 | 4,944 | 13.75 | 3,564 | 11.21 |
| Asia | 1,902 | 5.29 | 3,236 | 8.68 | 886 | 2.47 | 930 | 2.92 |
| Europe | 18,708 | 52.30 | 17,142 | 45.96 | 19,477 | 54.23 | 14,830 | 46.64 |
| Oceania | 29 | 0.08 | 24 | 0.06 | 13 | 0.03 | 14 | 0.04 |
| | 35,945 | 100.00 | 37,298 | 100.00 | 35,916 | 100.00 | 31,801 | 100.00 |

European trade suffered most severely from the war. The following are the countries which showed the greatest volume of trade with Brazil during 1939.

Shares of the various European countries in Brazilian foreign trade.
(Value in £ 1,000 gold)

| | Exports to | | | | Imports from | | | |
|-------------------------|------------|-------|--------|-------|--------------|-------|--------|-------|
| | 1938 | | 1939 | | 1938 | | 1939 | |
| | Value | % | Value | % | Value | % | Value | % |
| Germany | 6,852 | 19.06 | 4,479 | 12.00 | 8,976 | 24.90 | 6,160 | 19.37 |
| United Kingdom | 3,151 | 8.77 | 3,587 | 9.62 | 3,728 | 10.38 | 2,951 | 9.28 |
| France | 2,298 | 6.39 | 2,342 | 6.30 | 1,155 | 3.22 | 880 | 2.77 |
| Belgium-Luxemburg . . . | 1,285 | 3.57 | 1,065 | 2.86 | 1,441 | 4.01 | 1,347 | 4.24 |
| Sweden | 772 | 2.15 | 1,151 | 3.09 | 882 | 2.45 | 725 | 2.28 |
| Italy | 766 | 2.13 | 883 | 2.37 | 646 | 1.80 | 584 | 1.84 |
| Netherlands | 1,510 | 4.23 | 1,421 | 3.81 | 325 | 0.90 | 355 | 1.12 |
| Denmark | 600 | 1.67 | 574 | 1.54 | 233 | 0.65 | 129 | 0.38 |
| Norway | 96 | 0.27 | 177 | 0.47 | 132 | 0.37 | 146 | 0.46 |
| Portugal | 219 | 0.61 | 223 | 0.60 | 560 | 1.56 | 563 | 1.77 |
| Finland | 284 | 0.79 | 246 | 0.66 | 113 | 0.31 | 97 | 0.31 |
| Switzerland | 66 | 0.18 | 227 | 0.60 | 334 | 0.93 | 361 | 1.14 |
| Other countries | 889 | 2.48 | 766 | 2.04 | 952 | 2.66 | 532 | 1.68 |
| | 18,798 | 52.30 | 17,141 | 45.96 | 19,477 | 54.23 | 14,830 | 46.64 |

Trade agreements. — Brazil's most important trade agreement in the past few years was concluded with Argentina. The two countries find themselves in a similar situation because the European war has in both cases led to the loss of some of their most important European suppliers and customers. They are now trying to help each other by means of a very comprehensive agreement.

The scope of the agreement cannot be understood unless it is recalled that this commercial treaty, the first between the two nations, is intended to replace a treaty of friendship drawn up in very general terms in 1856, which had therefore attained the venerable age of 84 but no longer answered present-day economic needs. The competition which had arisen between these two American republics sometimes assumed a warlike character, but since a fundamental friendship really existed between them, this conflict was confined to the economic field. At the time when there was a divergence of interests between the two countries, Argentina, encouraged and supported by British capital, became an important source of foodstuffs and hides, while Brazil supplied the world first with rubber and later with coffee. A change has occurred during the past ten years. Argentina formerly exported wheat and a small quantity of fruit to Brazil, while in return Brazil supplied Argentina with timber and maté, the national drink. Argentina has now started growing maté and the exports of this product from Brazil to Argentina began to decline steadily from year to year. The new agreement repealed the 10 per cent. duty on Brazilian maté and placed imports of this product on a quota basis; Brazil, on the other hand, undertook to afford every possible facility for wheat and wheat flour imports from Argentina and not to make clearing arrangements to the detriment of imports of these two products from that country. It is hoped that, as a result of these provisions, it will be possible to stop the dumping of North-American wheat. In return, Argentina agrees not to make arrangements for the barter of coffee, cacao, rice, maté, tobacco and timber. Further,

Brazilian ships in Argentina and, vice versa, Argentinian ships in Brazil, will be treated as though flying the national flag. It is obvious that this arrangement is a means of avoiding the shortage of shipping which is threatening all the South American countries.

Brazil has also succeeded in concluding a treaty with Uruguay, her second neighbour to the South, with whom her trade balance was adverse. In order to cover the deficit, the Uruguay agreed to purchase 20,000 tons of Brazilian sugar.

For the purpose of stimulating trade with Brazil, Japan has submitted a list of 84 articles suitable for replacing European products required by Brazil; this list includes agricultural machinery, chemical products, silk goods and cotton products. If this trade develops, Japan will be able to purchase from Brazil large quantities of raw materials.

Brazil also concluded a new trade agreement with Australia on the basis of the most favoured nation clause.

The following arrangement has been concluded with Italy: ordinary trade will proceed on the lines laid down in the trade agreement of August, 1936. The agreement concerning the regulation of payments, concluded in September 1937 between the Banco do Brasil and the Istituto Nazionale per i cambi con l'estero, remains valid. Extraordinary trade, *i. e.* orders placed by the Brazilian Government or municipalities with Italian industry will be paid in free exchange and the sums will be credited to the Banco do Brasil. Italian traders will thus be able to make purchases in Brazil after obtaining the necessary permit from their own Government. Orders placed by the Brazilian Government must not exceed 200 million lire. No limit is fixed for the duration of the agreement, which may be denounced at any time.

Measures relating to marketing of agricultural products.

Agricultural marketing and production are strictly controlled by the Brazilian Government. This control is exercised by the following institutes created since the depression: the National Coffee Department (which is of long standing and has been repeatedly re-organised), the Cotton Service, the Sugar and Cacao Institutes and the National Maté Institute.

Two new organizations have been created since the outbreak of war:

(1) The Supply Commission (Comissão de Abastecimento) appointed to adopt the necessary measures in connection with any difficulties which may suddenly arise and prove detrimental to national economy. This commission also controls the price and distribution of commodities in cases where the failure of supplies may have a serious adverse effect on the condition of the country.

(2) The Commission for the Protection of National Economy (Comissão de Defesa de Economia Nacional), consisting of three members and under the direct control of the President of the Republic. The decisions of this commission come into force immediately after signature by the President and are published in the official Gazette. Unlike the first Commission mentioned, this Commission exercises control over the long-term development of the national economy and must always keep the international situation in view. As the result of the policy adopted by the allies, tending to reduce purchases and to regulate consumption, the condition of the Brazilian market has altered radically in comparison with conditions during the period 1914-1918. A small number of products have shown a rise in price, while the demand for all available merchandise, without regard to price or quality, has greatly increased. In the more or less near future the Commission expects a rise in the price of products which are becoming scarce and is attempting to turn this to the country's advantage. Since the beginning of 1940 the coffee and cotton markets have been rather weak; meat

hides, wax, castor oil seeds, vegetal oils and oilcake, on the other hand, have fetched high prices. The large income obtained from the latter products compensated for losses suffered on the first two articles, which are the chief export items.

The Government's efforts, dating many years back, to do away with the excessive concentration on coffee by introducing a greater variety of crops, are beginning to give their first fruits. It has been observed, however, that a whole series of products is assuming increasing importance on foreign markets; among these, mention may be made of Carnauba wax, rubber, para nuts and timber produced in the virgin forests or on the steppe lands and not in the cultivated areas. Production is generally financed by American capital. Most of the output of wax and Babassu nuts goes to North America.

During the past few years a new product of the Brazilian steppes has assumed importance; this is Oiticica oil, extracted from the nuts of the tree "*Licania rigida*" which grows on the steppes. This product has the same qualities and is used for the same purposes as tung oil. Since exports of tung oil to the United States have encountered difficulties due to the war in China, oiticica oil has been used largely to replace the former product on the market. Exports to the United States were estimated at 9,000 metric tons in 1939, as against 3,716 in 1938 and 87 metric tons in 1934.

Coffee. — The Santos market has recently been very quiet (May, 1940) and was awaiting intervention from the Coffee Department. No sales were made and prices were merely nominal. Shipments of sold merchandise diminished considerably in comparison with the record months of September-November, 1939 (more than 2 million sacks were shipped in October); only about 600,000 sacks were shipped in April, 1940, while 673,122 sacks were awaiting shipment due to the shipping shortage.

Incoming and outgoing coffee statistics for Santos do not seem to be unfavourable in comparison with last year:

| | Crop year 1938-39 | Crop year 1939-40 |
|--|----------------------|----------------------|
| | 60 kg. sack. | |
| Stocks at Santos on June 30, 1939 | 2,126,230 | 2,343,104 |
| Received between July 1, 1939 and April 27, 1940 | 9,064,766 | 7,999,003 |
| Shipments during the same period | 8,834,364 | 8,497,472 |
| | 2,356,652 | 1,844,637 |
| Quota sacrificed, adjustments, etc. | 38,292 | 39,725 |
| Stocks at Santos on April 27, 1940 | 2,318,360 | 1,804,912 |

The Brazilian coffee market is going through a period of severe crisis, because, as the result of the outbreak of war, the country has lost practically the whole of the European market. In spite of the serious damage caused by the rains to the 1940-41 crop, which will not exceed the estimate of 15 million sacks, the crop will be in excess of the demand. The quota to be sacrificed will remain the same, although no coffee has been destroyed for several months. A new invention has made it possible to process raw coffee, producing a plastic material, and it is now hoped that this will offer a means of utilizing surplus stocks of coffee. By this new method the raw beans are ground and the oil and other valuable chemical substances (caffeine) removed. The remainder is transformed into a plastic mass called cafelite, which is used for covering walls with an isolating material, for buttons, etc. The oil will be used for the manufacture of dyes and soaps, for medicinal purposes and especially for the preparation of vitamine D.

Cotton. — Exports by sea from all Brazilian ports totalled 323,539 metric tons in 1939, this figure being higher by 55,000 tons than that of 1938, the record year. Of this total 73 per cent. came from the State of São Paulo, and was shipped via Santos. The crop in this State totalled 273,222 tons in 1939, 235,795 tons being exported. The 1940 crop in São Paulo will be even more abundant, in spite of damage caused to the cotton plantations in various districts by drought or heavy rains. Under present circumstances it will be difficult to market this crop. Although Japan has placed a contract for the purchase of cotton at 53 milreis per 15 kg. of ginned cotton (at the rate of 20 milreis to the U. S. dollar), and although it is estimated that 120,000 metric tons will make their way to the markets of Eastern Asia, there will still remain 100,000 tons which should have been shipped to Europe and which it will be difficult to sell. The price of 53 milreis is not bad, however, and comes to 16 milreis per 15 kg. of raw cotton, offering a satisfactory profit if the crop should prove to be an average one.

Very few people know that Brazil was quite an important cotton exporting country as long ago as during the Secession Wars. At that time (1860 to 1870) she exported yearly between 3 and 5 million pounds sterling worth of cotton. As a result of the unfavourable prices offered on the world market combined with the rise in the price of coffee, the cotton crop was neglected. It was not until 60 years later (1931) that considerable quantities of cotton were again exported, amounting to 20.5 per cent. of the total exports.

Sugar. — The Sugar and Alcohol Institute exercises severe control over the output of the sugar factories, granting them fixed quotas. Sales are authorized only through or with the permission of the Institute. Any sugar produced over and above the established quotas is subject to a surplus tax and may only be placed on the market after payment of this tax.

According to fairly exact estimates made by the Institute (harvesting is almost completed), the sugar output in Brazil between June, 1939 and May, 1940, totalled 13,370,000 sacks of 60 kgs. Home consumption was expected to absorb 11,700,000 sacks, and 380,000 were to be destroyed (by transformation into alcohol); consequently 1,090,000 sacks were available for export.

During 1937 and 1938 the Sugar Institute maintained the price of sugar practically steady at 55.5 milreis per sack of crystallized sugar. Since no official statistics have been available, only nominal prices can be quoted. Sugar of the type *Usina* was quoted on the open market at Pernambuco at 49 milreis and crystallized sugar at 44.7 milreis per sack. It appears that an attempt is being made to keep prices low in order to compel the producers to give up their old routine methods of cultivation in favour of new and less costly intensive methods (irrigation, plant selection).

It is surprising to find that the retail price of sugar in Brazil is lower than anywhere else in the world, as it costs only 1.380 milreis per kg. as compared with 1.492 in Cuba and 2.435 in Argentina.

Oranges. — The very large size of Brazilian oranges has aroused criticism on the markets, as the standard cases cannot hold the required number of oranges. British importers have expressed a strong desire for the abolition of cases containing from 80 to 112 oranges and they also wish that the cases of 126 oranges should represent only 25 per cent. of the total quantity exported. "Outsize" cases are to be abolished. These measures will provide a stimulus to trade in Brazilian oranges.

Oranges have suffered more severely than any other product from the effects of the war, because they were sold almost exclusively in Europe and especially in England. Some hundred thousand cases only benefit from the 5/6 shilling freight guarantee for preferential transport. An attempt will have to be made to sell the remainder of the crop within the country, or at least in South America.

Maté. — The National Maté Institute has fixed the following prices for the 1940 crop: ground, stripped maté, export type, produced in the State of São Paulo brings the producer 0.900 milreis per kg. carriage free to Santos; the exporter obtains 1.250 milreis per kg. for packed maté, carriage free to Santos.

The Institute has established that harvesting in the State of Rio Grande do Sul may only take place between June 1 and September 30. A special service has been organized to instruct producers in the method of preparing maté for export and will provide them with the necessary implements. The Institute advances 50 per cent. of the value of the product on delivery.

Altogether 99 per cent. of total maté exports from Brazil are sold to the three neighbouring countries: Argentina (48 per cent.), Uruguay (36 per cent.), and Chile (15 per cent.). The remainder is exported to Europe.

Meat. — Exports of meat have made great progress during the last few months. Frozen meat fetches a good price in England; tinned meats are marketed in the United States and Canada.

Tea. — The devaluation of Brazilian currency led to a steady rise in the price of imported tea, resulting in a decline in imports from 58,802 kg. in 1933 to 23,860 kg. in 1938. Local production in the States of São Paulo and Minas Geraes increased, however, to such an extent that 41,370 kg. of this product were exported in 1938.

Migration. — During 1939 112,346 persons migrated from every part of Brazil to São Paulo, 50 per cent. establishing their residence in that State. Only a few years ago, the number of persons establishing their residence in the State amounted to 70,000, most of whom were foreigners. The numerous industrial and agricultural enterprises in the São Paulo State absorb considerable numbers of workers, the natural increase in the population not being sufficient to meet the demand for labour.

Brazilians settling in this State come from the north-western area of the country. The absorption of workers by this State is prejudicial to the progress of the other parts of the country, but the Northern States are still too undeveloped to pay the high wages offered in the South.

G. A. GEHLSSEN.

BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS

A. SERPIERI: *Corso di economia e politica agraria*. Vol. I. *L'agricoltura nell'economia della Nazione*. Firenze, G. Barbera, 1940. XVI + 582 pp., L. 70.

[In "*Principii di economia politica corporativa*" ("Principles of corporative political economy"), the second edition of which appeared in 1939, Prof. Arrigo Serpieri, of the University of Florence, explained the fundamental elements of general economic science, as a basis for the students' course in applied economics. This is now dealt with in a systematic and complete form with reference to agriculture in the "*Corso di economia e politica agraria*" ("Course of agrarian economics and policy") by the same Author, published in two volumes. The first volume which has just been published under the title "*L'agricoltura nell'economia della nazione*" ("Agriculture in the economy of the Nation"), considers the economic process in the agricultural sector of the national economy under the three aspects of production, circulation and distribution. The first chapter describes agricultural production as a whole, while the three following chapters deal with the three traditional categories constituting the means of production: land, capital and labour. The last chapter of this volume describes the characteristics assumed by the economic process in agriculture under the corporative régime as compared with the individualistic liberal system.

The economic process as regards production does not, however, appear to be properly understood unless the organization and operation of the basic unity, that is the farm, are thoroughly comprehended. The second volume of the course, entitled "*L'economia dell'azienda agricola*" ("Farm economics"), now under press, will supply the necessary information on this aspect of the subject.

Lack of space makes it impossible to analyse the various chapters of this important work, and we will therefore limit the present review to mentioning two chapters of particular interest, namely Chapter V on "L'agricoltura e il mercato" ("Agriculture and the market") and Chapter VI on "Il processo distributivo nell'agricoltura" ("The process of distribution in agriculture").

Describing the dependence of agriculture on the market in Chapter V, the Author states that even under a fully developed system of exchange economy, agriculture is less dependent on the market than are the other branches of production. Even to-day the trend of agricultural production—says the Author—is only dependent on prices to a limited extent. This is due to the existence in agriculture, side by side with the mercantile interest determined by the market and prices, of a non-mercantile interest, represented by the farmer's attachment to his land and his calling.

In connection with production costs in agriculture, it is observed that the study of these is of special importance at the present time, since costs form the basis for determining prices, which, when compulsorily fixed, exercise a decisive influence on the operation of farms, on the relative importance of certain crops and on technical progress. Under a system of controlled prices, the price is considered as "fair" when it corresponds to the cost price. But, as a matter of fact, there are cases where production continues even although prices fall below costs. This took place in Italy, for instance, as regards milk production. In cases of this description, account must be taken of the part played by capital invested in land, which, once so placed, cannot be freed, the farmer being consequently compelled to be content with large or small profits, according to circumstances. Above all, it is necessary to take into account the interrelations between the different crops and the different prices. When, in fact, the total value of output covers the costs considered as the aggregate value of the means of production to be used, it does not matter whether the price of a given product is lower if, at the same time, the price of another product is higher. In other words, the important point in determining "satisfactory" prices is, instead of dealing with each product separately, to consider all or at least the principal agricultural products simultaneously as a whole.

In discussing the process of distribution in agriculture, the Author studies the gross return and the net return, land values, earnings of agricultural labour, self-defence of the agricultural workers and the fiscal charges of agriculture.

After reviewing in the last chapter of the volume the most interesting regulations introduced by the corporative system in the sector of agriculture, the Author emphasises that these regulations are only the means adopted to attain a given end, namely, an even balance between production and consumption, a balance which should meet the Nation's essential needs in the most convenient way. Now, in an economic system such as the corporative régime, which retains the activity of private enterprise, these means must be kept within the minimum limits compatible with the attainment of the end in view; private enterprise too strictly controlled runs the risk of losing its justification; moreover, among the suitable means for attaining the goal, it is necessary to choose the simplest and the cheapest].

G. C.

SCHMIEDELER, Edgar. — *A better Rural Life*. J. F. Wagner, New York. XI, 304 p. \$ 2.75.

This volume by the Rev. Edgar Schmiedeler of the Benedictine Order deals with the activities of the Catholic Church among the rural classes in America. Much has been done in favour of these classes, the writer says; but much is yet to be done, especially in view of the fact that rural life is still the strongest hope and the most active defense of better, more moral living against the corruptive influences of city life. All the devices of modern educational and recreational science should be properly resorted to in order to induce the young rural generations to stick to the land rather than look for opportunities away from their natural surroundings. In Dr. Schmiedeler's opinion, the Catholic organisations are in a position to exert a strong active influence in this direction, even better than State educational institutions. A number of reasons are cited in support of this opinion and a long list of Catholic activities in various sectors of rural America is given, showing the work done and the results achieved. Improvements in such activities are suggested by the Rev. Schmiedeler, who has had a long and varied experience in the field with which he is dealing.

V. F.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

CHANGES IN THE PROFITABILITY OF AGRICULTURE IN SOME EUROPEAN COUNTRIES IN 1935-36 AND 1936-37

(Continued and concluded).

**Analysis of the results obtained in the following countries:
Estonia, Latvia, Lithuania, Poland, Bohemia and Moravia, Hungary,
Romania, Italy, Palestine.**

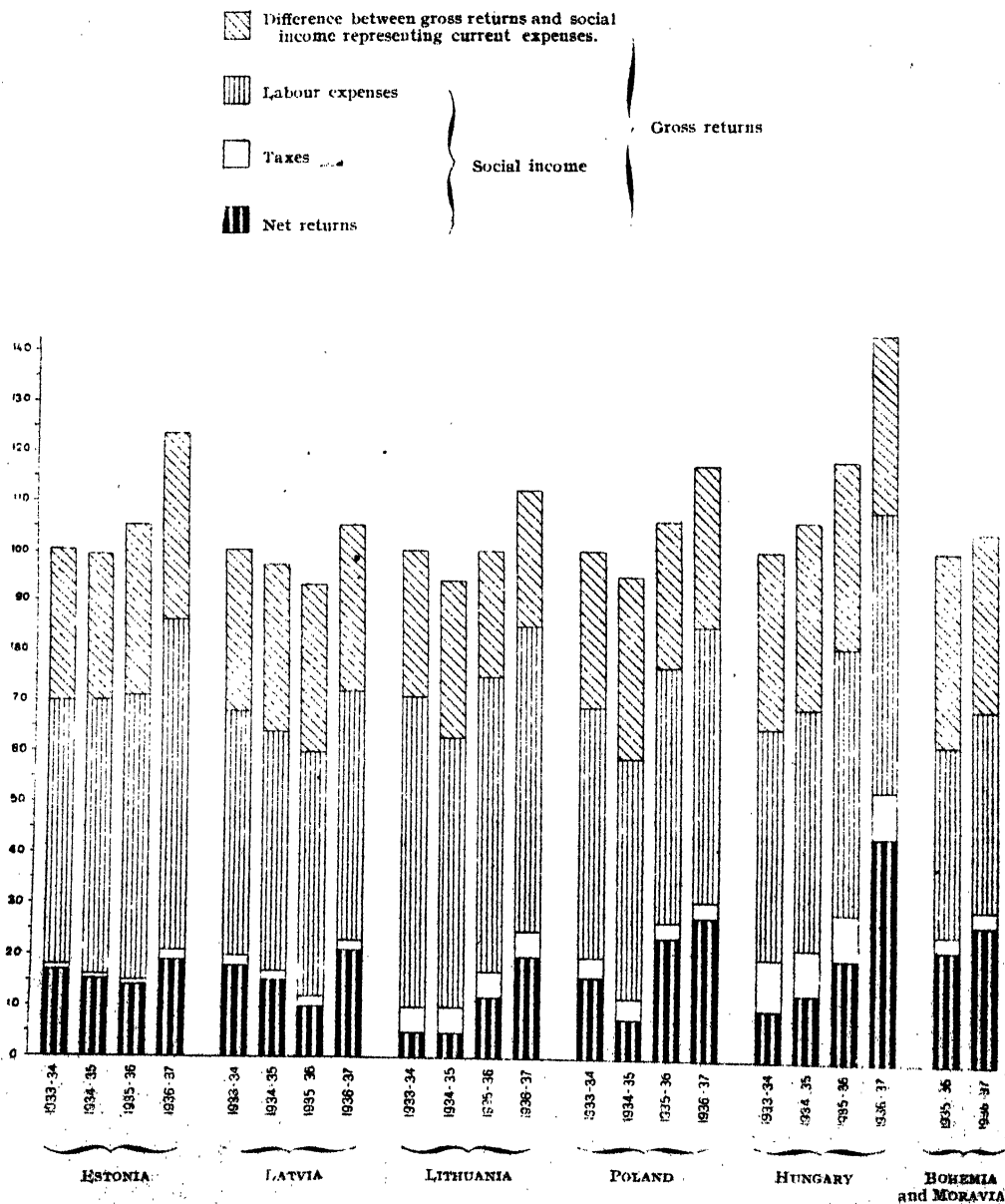
In the first part of the present article ⁽¹⁾, it was shown how the alignment of currencies which occurred in the autumn of 1936 led to a gradual improvement in the volume of foreign trade. It was also shown that the outcome of the efforts tending towards greater freedom of trade was very restricted and that the countries of Eastern Europe which are exporters of agricultural products appear to have benefited most widely in 1936-37 from the improvement in economic conditions and from the increase in German purchases of their agricultural products. These countries will now be considered in detail.

Diagram III illustrates the broad lines of the changes which occurred in the profitability of agriculture from 1933-34 to 1936-37 in Estonia, Latvia, Lithuania, Poland, Bohemia and Moravia, Hungary. Although the proportions varied from one country to another, the gross returns for 1936-37 were considerably in excess of those obtained in 1935-36. The greatest increase took place on the Hungarian farms. Since this increase in gross returns was not accompanied in all these countries by a corresponding increase in farm expenses, the net return in 1936-37 was higher than that obtained in 1935-36. The improvement in social income was considerable. Consequently, as was to be expected as the result of the improvement in general economic conditions, there was a definite improvement in the conditions of agriculture in the Eastern European countries during 1936-37.

Estonia. — The improvement in agricultural conditions in Estonia in 1936-37 was due to an increase in the price of agricultural products on home and foreign markets, as well as to an increased output of agricultural products. Although the rise in the price of these products was due to State intervention, two factors also played a part in this increase in output: the farmer's efforts and the favourable weather conditions. The area under crops was in-

⁽¹⁾ See Monthly Bulletin of Agricultural Economics and Sociology, No. 7-8, 1940.

DIAGRAM III. — *Average gross returns and social income of farms in Estonia, Latvia, Lithuania, Poland, Hungary, Poland, Bohemia and Moravia. (Gross returns for 1933-34 = 100).*



creased; the number of milk cows was unprecedented and milk production touched a record figure. Butter exports rose from 108,379 quintals in 1935 to 109,555 in 1936 and to 131,799 quintals in 1937.

Special establishments were founded for the centralization of trade operations and the export of agricultural products: the Central Union of Dairy Co-operative Associations for butter; the "Lihaekspord" for meat and live pigs and the Central Society of Co-operatives of egg producers.

Prices were guaranteed not only for rye and wheat, but also for first quality butter and cheese for export. These prices were higher in 1936-37 than in 1935-1936. The guaranteed price for eggs, bacon and pig meat could be paid without having recourse to supplementary subsidies from the special funds reserved for this purpose; on the contrary, the sums deducted from export prices made it possible to replenish these reserves.

At the same time sale prices, costs of production, and particularly (Diagram III) wages increased in 1936-37. Nevertheless, the rise in sale prices was greater than that registered in cost prices.

TABLE 11. — *Gross return, cost of production and profit or loss on total farm assets in Estonia in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farms assets | | | |
|--------------------|-------|--------------|--------------------|--------|--------------|--------------------------------------|---------|----------------------|---------|
| Cost of production | | Gross return | Cost of production | | Gross return | in crowns per hectare | | In % of gross return | |
| A | A | B | A | A | B | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| 94.78 | 86.72 | 91 | 105.18 | 101.44 | 96 | 8.06 | 3.74 | 7.29 | 3.69 |

A = In crowns per hectare.

B = Per 100 crowns of costs of production.

TABLE 12. — *Income and private consumption in Estonia from 1931-32 to 1936-37.*

| Year | Income ⁽¹⁾ in crowns per adult consumer | Consumption in crowns per adult consumer | Difference |
|---------|--|--|------------|
| 1931-32 | 333.85 | 481.73 | — 147.88 |
| 1932-33 | 307.69 | 405.53 | — 97.84 |
| 1933-34 | 500.16 | 431.74 | + 68.42 |
| 1934-35 | 510.07 | 446.85 | + 63.22 |
| 1935-36 | 513.17 | 471.39 | + 41.78 |
| 1936-37 | 657.70 | 000.0 | + 105.97 |

(1) Family farm earnings and additional earnings.

The deficit diminished sharply in 1936-37. The increase in the prices of agricultural products which would have been necessary to cover this deficit was reduced by half.

The income available for peasant families showed a considerable increase.

While in 1931-32 the consumer's requirements were 147.88 crowns in excess of the income he could earn in 1936-37 the consumer had a balance of 105.97 crowns to his credit after having covered all his farming requirements.

Latvia. — From a study of Diagram III it will immediately be observed that the economic conditions of Latvian farmers showed a great improvement in 1936-37. The gross return increased. The cost of production declined due to a fall in the cost of fertilizers and fodder, as well as in the interest rate.

The State encouraged agricultural production and increased the purchasing power of farmers by the control of markets. The existing measures were completed, improved and amplified by the promulgation of new laws.

The prices fixed during the previous years were maintained except in cases where the depression or the yield of the crops made an alteration necessary; changes in price were necessary in the case of cereals, peas, live pigs, export butter, eggs, potatoes for distillation, seeds for export, flax, hemp, sugar beets, hides, wool, seeds and cheese.

A special fund was created for the encouragement of stockbreeding and was distributed in subsidies for the purchase of animals of improved breeds and to assist milk control societies. Bonuses for the improvement of the quality of milk and consequently of butter were paid to farmers making a daily milk delivery.

Mention should also be made of the Government's efforts to lower farming expenses. Uniform prices were established for cement and chemical fertilizers. The Government also regulated the sale of building materials and transformed or reorganized rural co-operative societies.

The situation of the Latvian farmer showed a definite improvement in 1936-1937. For 100 lats of costs of production he obtained 106 lats gross return, as compared with 94 lats in 1935-36.

TABLE 13. — *Cost of Production, Gross Return and Profit or Loss on total farm Assets in Latvia in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farms assets | | | |
|--------------------|--------------|----|--------------------|--------------|-----|--------------------------------------|---------|----------------------|---------|
| Cost of production | Gross return | | Cost of production | Gross return | | in lats per hectare | | In % of gross return | |
| | A | B | | A | B | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| 134.49 | 125.83 | 94 | 132.79 | 141.21 | 106 | — 8.66 | 8.42 | — 6.88 | 5.96 |

A = Lats per hectare.

B = Per 100 lats of cost of production.

In 1935-36, the prices of agricultural products were not high enough to allow gross returns to cover the costs of production, and consequently the farmer incurred loss on his total farm assets. In 1936-37 the prices were fixed at a level high enough to raise gross returns above costs of production.

Lithuania. — The economic conditions of Lithuanian farmers were not so good in 1935-36 as those of Latvian and Estonian farmers: they only obtained 76 currency units of gross return for every 100 currency units of costs of production, Latvian farmers obtaining 94 and Estonian farmers 91. A considerable improvement in the situation was registered, however, from 1935-36 to 1936-37; as will be seen from the figures given below, the gross returns expressed in percentage of cost of production rose by 12 per cent. The price index of agricultural products began to rise in 1934; from 47.9 in 1934 (1913 = 100) it rose to 53.1 in 1935; reaching 63.1 in 1936. The loss incurred by farmers in 1936-37 did not exceed 20 litas per 100 litas of gross return, as compared with 30.64 litas in 1935-36.

TABLE 14. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets on Lithuanian farms in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farms assets | | | |
|--------------------|--------------|----|--------------------|--------------|----|--------------------------------------|---------|----------------------|---------|
| Cost of production | Gross return | | Cost of production | Gross return | | in lei per hectare | | In % of gross return | |
| | A | B | | A | B | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| 210.74 | 161.31 | 76 | 216.89 | 181.89 | 84 | — 49.34 | — 34.98 | — 30.64 | — 19.23 |

A = Litass per hectare.

B = Per 100 litas of cost of production.

Poland. — After six years of economic depression, the situation of Polish agriculture improved in 1936-37. An increase in home consumption, a decrease in the production of the principal cereals and a rise in the price of cereals on the world markets all led to a spontaneous increase in agricultural prices. The price index for agricultural products (1928 = 100) rose from 35.8 in 1935 to 38.7 in 1936 and to 49.2 in 1937. The price index for articles purchased by farmers, after declining in 1936, settled in 1937 at about the same level as in 1935: 1935 = 66.3; 1936 = 64.6; 1937 = 66.1.

In 1936-37 the average gross return on Polish farms increased more than did the cost of production, farmers obtaining 81 zlotys of gross return on every 100 zloty of cost of production in 1935-36 and 85 in 1936-37.

The ratio between gross return and cost of production was less favourable to farmers in the West and South than to those in the Centre and East. These results shows clearly, however, that the necessary increase in prices of agricultural products, if gross returns were to cover cost of production, would have required to be much smaller in 1936-37 than in 1935-36.

TABLE 15. — *Gross Return, Cost of Production, Profit or Loss on total and Farm Assets in Poland in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|------------------|--------------------|--------------|----|--------------------|--------------|----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | B |
| West | 364.96 | 268.45 | 73 | 378.72 | 274.92 | 73 |
| South | 376.65 | 299.65 | 80 | 408.69 | 330.34 | 81 |
| Centre | 317.54 | 267.52 | 84 | 322.94 | 293.25 | 91 |
| East | 174.05 | 152.84 | 88 | 182.92 | 177.46 | 97 |
| Average . . . | 300.07 | 243.97 | 81 | 318.63 | 270 | 85 |

| | Profit or loss on total farm assets | | | |
|------------------|-------------------------------------|----------|-------------------|---------|
| | in zloty per hectare | | % of gross return | |
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| West | — 96.51 | — 103.80 | — 42.81 | — 37.76 |
| South | — 77 | — 78.35 | — 33 | — 23.72 |
| Centre | — 50.02 | — 26.29 | — 24.35 | — 10.12 |
| East | — 21.21 | — 5.46 | — 17.80 | — 3.08 |
| Average . . . | — 56.10 | — 48.63 | — 22.99 | — 18.01 |

A = Zlotys per hectare.

B = Per 100 zlotys of cost of production.

Bohemia and Moravia. — The evolution of economic conditions in 1936-37 was marked by rapid progress. Share quotations showed a marked rise, whole-sale prices made only moderate progress, while the cost of living increased but slightly. The movement of merchandise showed a considerable surplus of exports. Generally speaking, agriculture benefited from these favourable conditions. The average gross return was 4 per cent. higher than in 1935-36 (see Diagram III).

As for cost of production (farm expenses plus interest on total capital invested), a slight increase was observed in certain groups of farms, while a decline occurred in others, as will be seen from the following figures.

In 1936-37 the average gross return almost reached the level of costs of production. The farms which gave the least satisfactory results in 1935-36 were those mainly engaged in stockbreeding and those with an area of over 50 hectares where the main activity was the cultivation of cereal crops. Everywhere else, there was a considerable decline in the amount by which the prices of agricultural products would have to be raised to bring gross returns up to the level of cost of production. Such was the position obtained even of farms with an area of less than 50 hectares where sugar beets formed the main crop.

TABLE 16. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets in Bohemia and Moravia in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|--|--------------------|--------------|-----|--------------------|--------------|-----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | B |
| Farms with an area of less than 50 hectares operated mainly for stockbreeding: . . | 2,879.85 | 2,703.67 | 94 | 2,896.14 | 2,683.10 | 93 |
| Farms producing mainly cereal crops:— | | | | | | |
| a) area under 50 hectares | 3,216.56 | 2,988.03 | 93 | 3,186.55 | 3,076.10 | 96 |
| b) area over 50 hectares | 2,811.95 | 2,852.65 | 101 | 2,877 | 2,870.62 | 100 |
| Farms producing mainly sugar beets: | | | | | | |
| a) area under 50 hectares | 3,918.32 | 3,623.39 | 92 | 3,908.75 | 3,927.14 | 100 |
| b) area over 50 hectares | 3,166.50 | 2,940.74 | 93 | 3,342.07 | 3,255.44 | 97 |
| Average | 3,307.64 | 3,106.09 | 94 | 3,322.28 | 3,246.74 | 98 |

| | Profit or loss on total farm assets | | | |
|--|-------------------------------------|----------|-------------------|---------|
| | crowns per hectare | | % of gross return | |
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| Farms with an area of less than 50 hectares operated mainly for stockbreeding: . . | — 176.18 | — 213.04 | — 6.51 | — 7.94 |
| Farms producing mainly cereal crops:— | | | | |
| a) area under 50 hectares | — 228.53 | — 110.45 | — 7.65 | — 3.59 |
| b) area over 50 hectares | 40.70 | — 6.38 | 1.43 | — 0.22 |
| Farms producing mainly sugar beets: | | | | |
| a) area under 50 hectares | — 294.93 | 18.39 | — 8.14 | 0.47 |
| b) area over 50 hectares | — 225.76 | — 86.63 | — 7.68 | — 2.66 |
| Average | — 201.55 | — 75.54 | — 6.49 | — 2.33 |

A = Crowns per hectare.

B = Per 100 crowns of cost of production.

Hungary. — The excellent harvests in 1936 and 1937 helped considerably to improve the general economic situation. From July, 1936, to January, 1938 no special difficulty was encountered in marketing the products. Marketing conditions in Hungary generally depend on the possibilities of export. The statistics of the Institute of Economic Research show that the exports of agricultural products rose from 311 million pengoes in 1935-36 to 394 million in 1936-1937. The price index for agricultural products (1913 = 100), rose from 79 in March, 1936, to 80 in March, 1937. As will be seen from the following figures, the gross return rose sharply in 1936-37 in comparison with costs of production.

The greatest increase in gross return was registered on the small farms; although much less pronounced, the increase was also considerable on the large

TABLE 17. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets in Hungary in 1935-36 and 1936-37.*

| | 1935-36 | | | 1936-37 | | |
|------------------------------|--------------------|--------------|----|--------------------|--------------|-----|
| | Cost of production | Gross return | | Cost of production | Gross return | |
| | A | A | B | A | A | B |
| Small farms | 281.52 | 254.68 | 90 | 270.19 | 311.95 | 112 |
| Medium-sized farms | 230.51 | 227.21 | 95 | 259.36 | 270.35 | 104 |
| Large farms | 251.02 | 223.99 | 89 | 271.04 | 272.31 | 101 |
| Average | 265.29 | 242.53 | 91 | 271.22 | 293.45 | 108 |

| Profit or loss on total farm assets | | | | | |
|-------------------------------------|---------|-------|-------------------|---------|-------|
| in pengoes per hectare | | | % of gross return | | |
| 1935-36 | 1936-37 | | 1935-36 | 1936-37 | |
| Small farms | — 26.84 | 32.76 | — 10.54 | | 10.05 |
| Medium-sized farms | — 12.30 | 10.99 | — 5.41 | | 4.07 |
| Large farms | — 27.03 | 1.27 | — 12.07 | | 0.47 |
| Average | — 22.76 | 22.23 | — 9.38 | | 7.57 |

A = Pengoes per hectare.

B = Per 100 pengoes of cost of production.

farms. Moreover, a clear idea of the improvement which took place in the condition of Hungarian farmers in 1936-37 may easily be obtained from observing the sharp rise in the balance of profit and loss on total farm assets. Prices of agricultural products were too low in 1935-36, while in 1936-37 they were so high that gross returns were greatly in excess of costs of production.

Romania. — Diagram IV shows the principal results of accountancy for some 300 Romanian farms distributed throughout the whole territory. Although the number of farms is not sufficient to make the data completely representative, the farms selected by the Accountancy Office are arranged according to size and give an idea of the position of the Romanian peasant during the two successive years under review ⁽¹⁾.

The farmers income and purchasing power improved as the result of good harvests and of the generally satisfactory prices due to the favourable condition of markets. As the result of Government intervention extensive new outlets

⁽¹⁾ Only the results for 1935-36 and 1936-37 are available for Italy and Palestine. Moreover, the number of Italian farms is too small to permit averages to be used.

were found for Romanian wheat. From August, 1936, to July, 1937, Romania exported some 1,020,000 metric tons of wheat worth 5,300 million leis. In order to stop the fall in prices on the home market and to encourage exports, a minimum price of 4,200 leis per metric ton was fixed during the period under review, with an export bonus of 300 leis per metric ton. The cultivation of the soya bean has been increasing from year to year; the area sown to this crop was 20,411 hectares in 1935, but rose to 58,037 in 1936 and to 102,000 in 1937. A series of measures was adopted to increase the areas sown to cotton, flax and hemp. The Government subsidised stockbreeding syndicates and granted export bonuses to these syndicates and to other exporters on live stock shipped, particularly to Eastern countries.

Gross returns fell off in 1936-37 (see Diagram IV and Table 18), but farm expenses and costs of production declined to an even greater extent. The net return and the social income increased considerably, as did the balance of profit or loss on total farm assets. While in 1935-36 Romanian peasants obtained 12 leis per 100 leis of costs of production, they obtained 143 in 1936-37. The balance of profit or loss on total farm assets improved by about 250 leis per hectare.

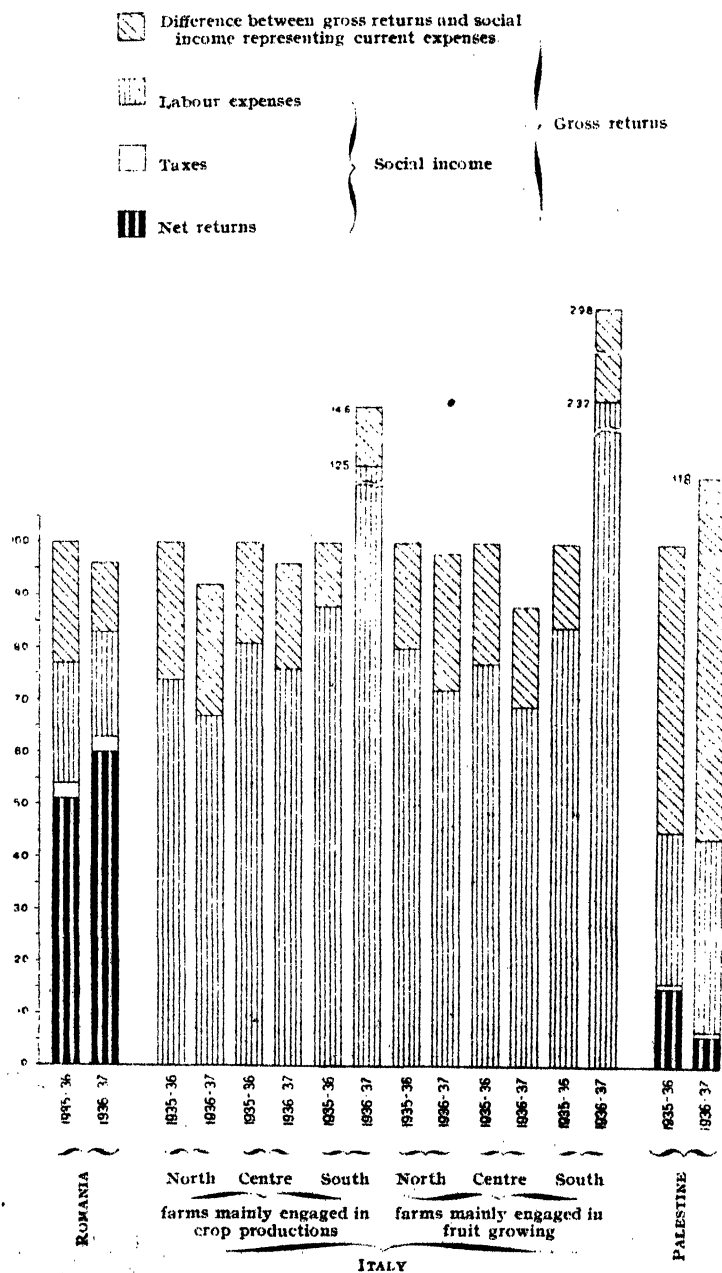
TABLE 18. — *Cost of Production, Gross Return, Profit or Loss on total Farm Assets in Romania in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farms assets | | | |
|---|--------------|-----|--------------------|--------------|-----|--------------------------------------|---------|----------------------|---------|
| Cost of production | Gross return | | Cost of production | Gross return | | in latus per hectare | | In % of gross return | |
| A | A | B | A | A | B | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| 3,322 | 4,169 | 125 | 2,794 | 3,987 | 143 | 847 | 1,193 | 20.31 | 29.92 |
| A = Leis per hectare. | | | | | | | | | |
| B = Per 100 leis of cost of production. | | | | | | | | | |

Italy. — The index numbers of prices of products sold by farmers (1928 = 100) rose, from 55.8 in 1934 to 64.5 in 1935, 70.0 in 1936 and 82.8 in 1937, while the index numbers for the products purchased by farmers and for wages, showed the following changes: 1934 = 71.6, 1935 = 73.8, 1936 = 79.9 and 1937 = 89.5. From these figures it will be seen that in 1934 the price index for agricultural products was 15.8 per cent. below that for agricultural requisites, while in 1937 the difference had declined to 6.7 per cent.

The fact that the harvest was on the whole better than in 1935 when weather conditions were adverse, and that prices were higher, led to a considerable improvement in the conditions of agriculture in 1937. This is proved by the fact that farmers' arrears with the credit institutions tended to decline and had indeed been wiped out by the more experienced farmers. Judging from the results shown in a digest of the accounts of certain groups of farms made by the National

DIAGRAM IV. — *Average gross returns and social income of farms in Romania, Italy and Palestine (Gross returns for 1935-36 = 100).*



Institute of Rural Economy which are, however, too few to be representative, 1936-37 was a less profitable year than 1935-36 (Diagram IV). Exception should be made for farms in the South of Italy, where arboriculture is of prime importance: here the gross return and social income both registered a considerable increase. A similar increase was observed in gross return and social income on farms in South Italy where the main crops consist of cereals and roots. The results obtained in the North and Centre of the country were less satisfactory in 1936-37 than in 1935-36: the gross returns fell, and farm expenses increased in relation to gross return.

TABLE 19. — *Gross return, social income and farm expenses in various groups of Italian farms in 1935-36 and 1936-37.*

| | 1935-36 | | | | |
|---|--------------|---------------|----|---------------|----|
| | Gross return | Farm expenses | | Social income | |
| | A | A | B | A | B |
| Farms mainly engaged in crop production: | | | | | |
| North | 2,887 | 739 | 26 | 2,148 | 74 |
| Centre | 1,483 | 274 | 19 | 1,209 | 81 |
| South | 797 | 95 | 12 | 702 | 88 |
| Farms mainly engaged in the cultivation of fruit trees: | | | | | |
| North | 2,643 | 520 | 20 | 2,123 | 80 |
| Centre | 1,890 | 435 | 23 | 1,455 | 77 |
| South | 1,035 | 165 | 16 | 870 | 84 |

| | 1936-37 | | | | |
|---|--------------|---------------|----|---------------|----|
| | Gross return | Farm expenses | | Social income | |
| | A | A | B | A | B |
| Farms mainly engaged in the cultivation of roots: | | | | | |
| North | 2,647 | 725 | 27 | 1,922 | 73 |
| Centre | 1,425 | 293 | 21 | 1,132 | 79 |
| South | 1,160 | 168 | 14 | 998 | 86 |
| Farms mainly engaged in the cultivation of fruit trees: | | | | | |
| North | 2,583 | 680 | 26 | 1,903 | 74 |
| Centre | 1,656 | 356 | 21 | 1,300 | 79 |
| South | 3,082 | 683 | 22 | 2,399 | 78 |

A = Lire per hectare.

B = Per 100 lire of gross return.

It will be seen that farm expenses in the North were higher in comparison with gross returns than in the Centre and, especially, in the South, and also that a sharp rise in gross returns on farms in the South where fruit-growing predominates, leads to a considerable increase in farm expenses.

Palestine. — The figures for this country comprise the results obtained over a period of two years (1935-36 and 1936-37), on 19 collective farms providing work and food for 1773 adults and their children. All the work is done by members of the farm, the land belonging to the national Zionist fund, although a part of the ground has been granted in perpetuity to the farmers by colonizing institutions; the remainder has been rented to them until their own land offers them a satisfactory income.

Gross returns increased by 18 per cent. from 1935-36 to 1936-37, but the net return fell off (Diagram IV). Farm expenses increased more than did gross returns; the cost of labour, for instance, was much higher in 1936-37 than in 1935-36. Social income proved to be slightly lower in 1936-37 than in 1935-36. The price of agricultural products would have had to be twice as high in 1936-37 as in 1935-36 to allow the gross return to cover costs of production:

TABLE 20. — *Cost of Production, Gross Return and Profit or Loss on total Farm Assets on 19 collective farms in Palestine in 1935-36 and 1936-37.*

| 1935-36 | | | 1936-37 | | | Profit or loss on total farm assets | | | |
|--------------------|--------------|----|--------------------|--------------|----|-------------------------------------|---------|-------------------|---------|
| Cost of production | Gross return | | Cost of production | Gross return | | in £ per hectare | | % of gross return | |
| | A | B | | A | B | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| 29.93 | 27.32 | 91 | 38.72 | 32.39 | 84 | 2.61 | 6.33 | 9.56 | 19.54 |

A = Pounds sterling per hectare.
B = Per 100 pounds sterling of cost of production.

Conclusions.

From a glance at the diagrams the reader will have seen that social income represents the general increase in value achieved on a farm: he knows that it is obtained by deducting from the gross return all farm expenses except wages and taxes, or, in other words, working expenses. The following table illustrates the variations which have occurred in social income, expressed as a percentage of gross return, during the period 1935-36 to 1936-37, in each of the countries reviewed in these two articles. In order to facilitate a comparison of results groups of farms where the cultivation of cereals predominates have been selected in the case of France, Scotland and Italy, countries where data were lacking for the calculation of averages. For all other countries average figures have been used.

TABLE 21. — *Social Income per 100 currency units of Gross Return in 1935-36 and 1936-37.*

| | Gross return per hectare | | Social income | | | |
|--|--------------------------|----------|---------------|----------|-------------------|---------|
| | 1935-36 | 1936-37 | per hectare | | % of gross return | |
| | | | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| Denmark, <i>crowns</i> | 609 — | 616 — | 312 — | 292 — | 51 | 47 |
| Overijssel (Netherlands) <i>florins</i> | 231 — | 287.46 | 117.20 | 155.19 | 51 | 54 |
| Norway, <i>crowns</i> | 639.10 | 663.16 | 352.50 | 365.70 | 55 | 55 |
| Sweden, <i>crowns</i> | 397 — | 424 — | 228 — | 240 — | 57 | 57 |
| Switzerland, <i>francs</i> | 1,081 — | 1,083 — | 642 — | 676 — | 59 | 62 |
| Bohemia and Moravia, <i>crowns</i> | 3,106.09 | 3,246.74 | 1,933.74 | 2,153.98 | 62 | 66 |
| Hungary, <i>pengoes</i> | 242.53 | 293.45 | 167.12 | 222.04 | 69 | 76 |
| Latvia, <i>lats</i> | 125.83 | 141.21 | 81.43 | 96.50 | 65 | 68 |
| Estonia, <i>crowns</i> | 86.72 | 101.44 | 58.76 | 70.73 | 68 | 70 |
| Poland, <i>Zlotys</i> | 243.97 | 270 — | 175.24 | 194.83 | 72 | 72 |
| Lithuania, <i>litas</i> | 161.31 | 181.89 | 120.37 | 137.46 | 75 | 76 |
| Romania, <i>leis</i> | 4,169 — | 3,987 — | 3,236 — | 3,449 — | 78 | 86 |
| France (Soissons, farms growing industrial crops), <i>francs</i> | 2,338.18 | 3,178.62 | 1,220.48 | 1,679.82 | 52 | 53 |
| Scotland, farms where cultivation and the feeding of cattle and sheep predominate, £ | 24.68 | 24.59 | 13.79 | 14.24 | 56 | 58 |
| Italy, North, farms where the cultivation of cereals and root predominate, <i>lire</i> | 2,887 | 2,047 — | 2,148 — | 1,922.40 | 74 | 73 |
| Palestine, £ | 27.32 | 32.39 | 12.14 | 12.04 | 44 | 37 |

TABLE 22. — *Profit or Loss on total Farm Assets per hectare and in percentage of Gross Return in 1935-36 and 1936-37.*

| | Profit or loss on total farm assets | | | |
|--|-------------------------------------|---------|-----------------------|---------|
| | per hectare (1) | | % of gross return (2) | |
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 |
| Denmark, <i>crowns</i> | — 9 — | 48 — | 1.48 — | 7.79 |
| Overijssel <i>florins</i> | — 70.63 — | 34.16 — | 30.57 — | 11.88 |
| Norway, <i>crowns</i> | — 35.30 — | 33.67 — | 5.52 — | 5.08 |
| Sweden, <i>crowns</i> | — 7 — | 4 — | 1.76 — | 0.94 |
| Switzerland, <i>francs</i> | — 134 — | 88 — | 12.39 — | 8.13 |
| Bohemia and Moravia, <i>crowns</i> | — 201.55 — | 75.54 — | 6.49 — | 2.33 |
| Hungary, <i>pengoes</i> | — 22.76 — | 22.23 — | 9.38 — | 7.57 |
| Latvia, <i>lats</i> | — 8.66 — | 8.42 — | 6.88 — | 5.96 |
| Estonia, <i>crowns</i> | — 8.06 — | 3.74 — | 7.29 — | 3.69 |
| Poland, <i>Zlotys</i> | — 56.10 — | 48.63 — | 22.99 — | 10.81 |
| Lithuania, <i>litas</i> | — 49.34 — | 34.98 — | 30.64 — | 19.23 |
| Romania, <i>leis</i> | — 847 — | 1,193 — | 20.31 — | 29.92 |
| France (Soissons) farms producing industrial crops, <i>francs</i> | — 90.33 — | 42.57 — | 5.41 — | 1.34 |
| Scotland, farms where cultivation and the feeding of cattle and sheep predominate, £ | — 3.37 — | 4.76 — | 13.65 — | 19.36 |
| Italy, North, farms where the cultivation of cereals and roots, predominate, <i>lire</i> | — — — | — — — | — — — | — |
| Palestine, £ | — 2.61 — | 6.33 — | 9.56 — | 19.54 |

(1) The figures included in the first two columns, when preceded by a minus sign (—), indicate the amount lacking to provide normal interest on the total capital invested; figures without a minus sign (—), indicate the amount in excess of normal interest. In the former case the cost of production has not been completely covered by gross returns. — (2) The figures included in the last two columns indicate the proportions in which prices of agricultural products would require to have been increased or reduced to allow gross returns to cover cost of production exactly.

With the exception of Palestine, the social income represents more than half the gross return in each of these countries; in the Eastern European countries it represents two-thirds and sometimes even more (in Romania four-fifths) of the gross return. Calculated on a basis of gross return, social income remained stationary in Norway and Sweden, while it declined in Denmark and in Palestine, as well as in Italy on the farms in the North mainly engaged in the cultivation of cereals and roots; it increased to a greater or less extent in the other countries.

Prices of agricultural products in Sweden, Hungary, Latvia, Romania, in the *Soissonnais* (France) and on the Scottish farms where cultivation and cattle and sheep breeding predominate, were high enough to allow for normal interest on capital invested in the farm and also to enable the gross returns to cover the costs of the production. In all the countries, excepting Denmark, Sweden and Palestine, the increase in the price of agricultural products was greater in 1935-36 and 1936-37 than the increase in the price of agricultural requisites.

J. DESLARZES.

CROP INSURANCE

(Continued and concluded)

SUMMARY: Introduction. The purpose of this first part is to outline the difficulties encountered in the introduction of insurance which aims at covering loss incurred from two or more forms of crop damage mentioned in the policy. — *Early forms of crop insurance.* The second part deals with early attempts to organize this form of insurance, which is of fairly recent date. — *Recent institutions.* The third part contains a study of the various forms of this kind of insurance in the different countries where it has already found practical application, namely, in Switzerland, Greece, France, Bulgaria, the U. S. S. R., the United States of America and Japan.

Recent Institutions.

The following information concerning the organization of recently created institutions presents many points of interest.

In *Switzerland* several cantons have organized joint crop insurance against loss from natural causes ⁽¹⁾.

A public insurance scheme was launched in the Canton of Nidvalden in 1920 offering relief in the case of uninsurable loss due to natural causes affecting buildings, cultivated land and fruit trees. Damage to forest areas is only covered if the funds in hand amount to 300,000 francs.

The risk of damage due to weight of snow was excluded in 1933.

All landowners, corporations and common alpine lands are compelled to join the scheme. Relief funds are administered by the cantonal treasury Office and consist of annual subscriptions from cantonal landowners, a given percen-

⁽¹⁾ Much information concerning the organization of this branch of insurance in Switzerland has been obtained from the important work by LANZ-STAUFFER and ROMMEL, already quoted.

tage of the cantonal quota of the federal war tax, plus a given percentage of the annual net profits of the cantonal fire insurance Institute.

Every person with juridical status who contributes to the relief fund (including therefore those who are not compelled to join in the scheme), is entitled to compensation from the fund. The percentage of damage for which compensation may be paid is fixed by law and varies according to the funds in hand. Moreover the total amount of damage for which compensation is paid may not exceed a certain percentage of the total fund; this percentage increases in proportion to the amount of money in hand. No compensation is paid for losses under 100 francs.

A law was passed on April 26, 1936, altering and improving the organization of the relief scheme, one of the principal changes being the creation of a new source of revenue: 20 per cent. of the proceeds of the town water rate. Another change enables the fund to be applied to certain works for the prevention of damage as well as to the actual compensation for loss incurred.

Although the law does not mention insurance, this scheme has been considered as offering a form of partial insurance, since a large part of its revenue consists of payments from owners of real estate and sufferers are entitled to a uniform rate of compensation without regard to their financial situation. The fact that compensation is partial does not alter the nature of the payment made.

A semi-governmental relief scheme was launched on April 30, 1922, at Appenzell, Ausser Rhoden, for owners suffering loss from uninsurable damage due to natural causes. Damage to the woods in the higher areas from the weight of snow and damage caused by frost and insects and harmful factors of a vegetal nature were not included in the compensation offered under the scheme. Crops already insured against loss from hail were of course not covered by this scheme. The scheme covered damage to buildings, soil and crops, and participation in it was compulsory for all private and public owners of real estate.

The scheme was financed by fixed subscriptions in proportion to the current value of property.

Compensation was fixed at not less than 20 per cent. and not more than 50 per cent. of the loss incurred. In practice compensation was paid for about 35 per cent. of the loss, and on a minimum loss of 200 francs.

Although the law does not mention insurance, the scheme was looked upon as a partial insurance for the same reasons as have already been given in the case of the scheme operating in the Canton of Nidvalden.

Under the law of April 27, 1930 this organization was replaced by another which inherited its rights and obligations and which is administered free of charge by the cantonal Fire Insurance Institute. The purpose of this new organization is to insure buildings and the soil, as well as fruit trees, vines and market garden produce as part of the soil, against the risk of loss from damage caused by wind, storms, floods and rising waters, landslips, soil subsidence, falling stones, avalanches. Earthquakes are not included in the insurance. Besides certain items which do not form part of crops, forest plantations are excluded from this branch of insurance but may be included if funds are available. Membership of the scheme is compulsory for all

landowners in the canton, semi-governmental unions, corporations, communes and the State.

The scheme's ordinary revenue consists of a fixed amount for every 100 francs of the soil's commercial value. Under the law of April 27, 1930, on the insurance of buildings, a contribution is made to the fund by the cantonal fire insurance institute amounting to one third of the difference between its yearly income and outlay.

Compensation for damage caused to cultivated land and the crops mentioned amounts to 50 per cent., starting from 100 francs, and, if the buildings have also suffered, the payment is divided between the two.

An organization offering compensation for losses due to natural causes was founded in the canton of Grisons on January 18, 1925. This organization is managed by the cantonal financial administration and membership is compulsory for all owners of real estate, except the Government, the communes and the railway and electric companies.

At the outset the purpose of this scheme was to offer partial compensation for uninsurable loss due to natural causes incurred by buildings and cultivated land. Later, in 1932, with the introduction of insurance of buildings against damage from natural causes, the organization gave up this branch of insurance, and while continuing to offer compensation for damage to cultivated land, added damage to crops including fruit trees and forests.

The resources of the organization consist of subscriptions from real estate owners, grants from the canton and from the cantonal fire insurance institute. This last was abolished in 1932 after the introduction of insurance for buildings against damage from natural causes. Compensation is paid to private individuals only for loss exceeding 100 francs; the State, the communes and the railway and electric companies are not entitled to compensation, the percentage of which is fixed in proportion to the funds available.

As in the case of the cantons of Nidvalden and Appenzell, although insurance is not mentioned, this institution is considered as offering partial insurance.

During the preparatory work leading to the introduction in 1932 of insurance of buildings against loss due to damage from natural causes, the creation of an organization offering insurance against risk of damage to cultivated land and crops was also contemplated, but only the former institution was established under the law of March 6, 1932.

The plans for handling insurance of cultivated land and crops made it compulsory for all tax-paying owners of cultivated land to insure themselves with the cantonal insurance organization against damage caused to cultivated land and crops by flood and rising waters, landslips, falling stones, soil subsidence, storm, weight of snow and avalanches (hail risks were also originally included in the list). This organization was to have been managed by the financial administration under the control of the State Council.

The resources of the organization were to consist of yearly premium of 20 per thousand of the fiscal value of cultivated land, including woods, alpine pasturages and ordinary grazing land in the canton. An annual grant of 30,000 francs

from the cantonal Bank and grants from the Confederation, gifts, bequests and collections were also contemplated.

Compensation was to be fixed in proportion to the resources of the scheme, and also in proportion to the financial status of the sufferers; it was to be not less than 20 per cent. of the loss sustained (except in the case of certain damage), and not more than 70 per cent. of this loss, while no compensation was to be given for the first 100 francs of damage sustained by each insured party. Government bodies, *i. e.*, the Confederation, the Cantons and the communes were not entitled to compensation.

Under the terms of the law of November 13, 1927, a central organization for hail and frost insurance was founded in *Greece*. This semi-governmental organization, controlled and supervised by the Minister of Agriculture, conducts both optional insurance and reinsurance for local agricultural associations, mutual insurance institutes, agricultural associations and unions and for hail and frost insurance institutes handling risks to vines, tobacco and other agricultural products mentioned in a list drawn up by the organization. This organization has been empowered, after ratification by the Minister of Agriculture, to underwrite insurance and reinsurance also against risk of other damage due to meteorological conditions.

The initial capital of this organization consists of sums received in virtue of the Decree Law of June 29, 1923, regarding the compensation payable to vine growers suffering loss from hail and by the surplus of the State sulphur, copper sulphate and "peronosporin" management.

The sources of annual revenue of the organization, apart from the premiums paid in, consist of a charge on sultana exports, and on the amount of wine stored, consumed, transported or exported.

In the event of the annual income being insufficient to cover compensation payments, the reserve capital may be drawn upon to the maximum of 50 per cent. No further use may be made of the reserve capital in the course of the following years to pay off compensation claims unless the reserve has been made up to a sum at least equivalent to the initial capital. In the event of the organization's own resources being insufficient to make compensation payments even after drawing upon 50 per cent. of the reserve, the institution may borrow up to the amount of its requirements.

Agricultural reinsurance associations or the special reinsurance companies may reinsure themselves with this organization under certain conditions, including the following: the purpose of their activity must be the insurance of vines, tobacco and other agricultural products against the risk of damage by hail; their members must insure the whole of their crop of the products mentioned, and the organization may not make compensation payments for damage amounting to less than 10 per cent. of the insured capital. The organization may grant reinsurance up to a maximum of 90 per cent. of the insured capital (¹).

In *France*, by a law promulgated on January 9, 1929, the Government organized reinsurance granted under the departmental schemes insuring tobacco

(¹) ARCOLEO: *Monthly Bulletin of Agricultural Economics and Sociology*, April, 1938.

growers against damage by hail and other adverse meteorological conditions, placing this branch of insurance under the control of three guarantee organizations: the "caisse départementale", the "caisse du centime" and the "caisse autonome" handling national defence bonds and the management of industrial tobacco farms.

The "caisses départementales" compensate growers for their losses, on condition that the total amount allotted to each one plus the sum obtained on delivery of the crop must not exceed 80 percent. of the estimated value of their crop after deduction of the expenses which the farmer would have incurred if his crop had not been damaged.

In the case of the "caisse du centime", established by a law promulgated on April 21, 1932, this organization's share in the guarantee mentioned above is financed by a supplementary deduction from the price of all tobacco delivered fixed by the Minister of Finance, which must not exceed a certain limit established by law (initial basis: 0 centime 30; maximum 1 centime 30).

The "caisse autonome" handling national defence bonds and the business of industrial tobacco farms contributes under the twofold form of a guarantee subsidy and reimbursable loans. The guarantee subsidy supplied must in any case be equal to that furnished by the "caisse du centime" estimated on its initial basis. This figure represents the annual subsidy granted by the "caisse autonome" for the formation of a common fund. This charge may however be increased up to the maximum limit fixed by the "caisse du centime". The difference between the initial basic charge and the maximum charge constitutes a temporary charge used exclusively for the extinction of reimbursable loans which will be described below. Besides the guarantee subsidy this organization may also contribute a supplementary guarantee in the form of non-interest bearing loans repayable within a maximum term of 15 years. The total amount of loans not repaid may in no case exceed the amount of the yearly contribution specially earmarked for their repayment multiplied by 15 (1).

Many efforts have been made in France to organize a system of protection against risk of damage from natural causes.

We will not, however, describe these projects nor yet the discussions which preceded the promulgation on December 30, 1928, of the important financial law (2). Article 145 of this law provides for the establishment, as from January 1, 1930, of a national scheme of insurance, reinsurance and protection for the victims of agricultural disasters, compensating them for damage to their crops from hail, frost, flood and hurricane. This article also contemplated the drafting of a special law fixing the institute's sources of revenue and the conditions under which it would conduct business.

A large number of suggestions and draft laws were deposited with the Chamber and the Senate concerning the organization of a national scheme with the above objectives. In order to guarantee the application of article 145 of the financial law promulgated in 1928, the Government itself deposited a draft law con-

(1) LA RÉASSURANCE, Paris, 1929, p. 57 and 675.

(2) ARGENTIER: Les allocations pour dommages causés par les calamités agricoles, Paris 1935, p. 19.

cerning the organization of the national institute for damage to crops with the office of the Chamber of Deputies on December 19, 1929.

In its meetings of March 12, 13 and 15, 1932, the Chamber of Deputies voted its approval of articles 55-*b* and 55-*g* of the finance bill for the financial year 1933; among other things, these articles provided for the creation of a national public institute for reinsuring in the 2nd degree, the agricultural mutual societies governed by the law of July 4, 1900, and offering insurance against the risk of hail, spring frosts and mortality among livestock. The special subsidies assigned to these societies were proportionate to the subscriptions of the members when the subscription rate exceeded a certain figure established by order; medium term loans from the regional banks for agricultural credit were also contemplated for these benefit societies. Lastly the law provided for the creation of a "caisse de solidarité" in cases of damage to crops; this institution granted compensation to persons who had suffered loss from flood, hurricane and, on a temporary basis, to those whose crops had been damaged by hail and spring frosts before being insured.

But the Finance Committee of the Senate substituted new articles dealing only with the encouragement of hail insurance, and the Senate finally adopted a project creating an institute offering relief for the damage contemplated in the financial law promulgated in 1928.

Later, the financial law passed in 1932 created a "caisse de solidarité" for damage to crops; this institute grants allowances to persons who have suffered loss of capital or crops due to damage by frost, flood and hurricane. Special regulations were drawn up for hail insurance. A temporary arrangement was made, however, covering a five-year period, providing also for the payment by the "caisse de solidarité" of compensation to uninsured farmers who had suffered damage from hail.

But the activities tending towards the creation of a crop insurance organization were not at an end.

In 1937 the Ministry of Agriculture submitted a bill to the Chambers of Agriculture for consideration; this bill contemplated the creation of a central organization for insurance against agricultural risks ⁽¹⁾.

The bill was not well received. Many of the Chambers submitted objections and suggested the alternative of optional insurance for separate risks ⁽²⁾.

The project is interesting, however, because it represents a new attempt to solve the question of crop insurance against damage due to natural causes.

The central institution contemplated in the bill in question would have organized insurance and reinsurance against risk of damage incurred by farmers from hail, hurricane, flood and livestock mortality ⁽³⁾. This organization was to have been a public institution enjoying civil status and financial independence; the technical side of its administration was to have been under the control of the Ministry of Agriculture, the financial side under that of the Ministry of

(1) *Argus*, Paris, June 13, 1937, p. 837.

(2) *Le Temps*, May 14, 1938.

(3) *L'Argus*, June 6, 1937.

Finance. Provision had been made for the establishment in each department of a departmental committee, for crop damage whose duties were to have included the approval of the mutual societies offering insurance or reinsurance under the conditions contemplated in the project itself and the creation or extension of the sphere of activity of the mutual societies offering insurance or reinsurance for crop damage; if necessary, these committees were also to submit proposals to the central institution concerning the establishment of departmental organizations offering insurance and reinsurance against risk of damage to crops. Every farmer who was not a member of a mutual society offering this type of insurance and approved by the departmental committee was to be compelled to join the departmental insurance institution created under the terms of the law.

Subscriptions were to be fixed for each region or department and for each branch of risk to enable compensation to be paid up to a maximum of 50 per cent. of the loss incurred; 10 per cent. of the capital insured was not entitled to compensation. Subscriptions were to consist of two distinct elements. Firstly, a uniform rate throughout the whole territory to be exacted for the central institute for crop damage; this rate was to be determined on a temporary basis and adjusted at a later date. The funds forming this part of the subscription were to be obtained from the traffic dues on wines, a tax on fruit trees, another on cultivated area (not including vines, grazing land and fruit trees), and a tax on livestock; the revenue from the above taxes was to be applied to the branch of insurance covering vines, fruit trees, cereals and various other crops and also to that handling livestock mortality. The variable element was to be calculated on the basis of risk incurred in the various regions, and according to the kind of crop or form of stockbreeding; this part of the subscription was to be exacted for the mutual societies or departmental institutions. The rate of the variable element was to be fixed for each department by an order issued by the Ministry of Agriculture and the Ministry of Finance on the proposal of the central institute.

The reinsurance section was to underwrite surplus risks compulsorily reconveyed by the reinsurance institutes. The quotas of reinsured risks and reconveyed premiums were to be fixed every year for each branch by an order from the Ministries of Agriculture and Finance.

The institute's funds were to be formed by the percentage of subscriptions reconveyed to the central institute by the reinsurance, mutual or departmental organizations and by the contributions to the uniform tax mentioned above. The last provision of the project stated that in the year following the promulgation of this law the existing contracts for hail and livestock mortality insurance were to be annulled regardless of all provisions to the contrary ⁽¹⁾.

Insurance in the U. S. S. R. is handled by the State, through a federal insurance organization called the *Gosstrach*.

Insurance of crops against damage from natural causes is compulsory, but a form of complementary optional insurance was subsequently instituted ⁽²⁾.

⁽¹⁾ *L'Argus* and *La Semaine*, international insurance journal, June 6, 1937.

⁽²⁾ *RIBNIKOV*. *Oesterreichische Revue*, November 2, 1936.

MISLIVEC. *Oesterreichische Revue*, February 13, 1936.

Compulsory insurance affects collective farms and primary co-operative organizations, as well as members of collective farms in respect of their individual allotments, and individual farmers. Farms which are subject to the individual agricultural tax and holdings of the third category of tax-payers and persons without electoral rights are excluded from insurance. The risks covered vary according to the type of farm and crops.

We will only deal with crop insurance, and will not describe the forms affecting livestock and other agricultural property.

The following crops on collective farms and on holdings of primary co-operatives are insured against flood and hail: plants grown on farms and garden and vineyard crops are insured against hail; sowings of farm plants and garden and vineyard crops are insured only against risks of torrential rains, storm and fire; certain special crops and crops of industrial plants are insured against damage from natural causes, pests and plant diseases; flax and hemp crops are insured against drought; lastly, sowings of red clover are insured against drought and frost.

The individual allotments belonging to members of collective farms and the farms operated by individual farmers are insured as follows: farm plants and garden and vineyard crops are insured against hail, torrential rains and storm; crops of farm plants, not including vegetable gardens, and melons and berries in certain regions, but including vineyards in certain other regions are insured against damage by water (suffocation), frost, rot (due to excessive moisture) and flood; certain special and industrial crops are insured against damage from natural causes, pests and plant diseases; flax and hemp crops are insured against drought; sowings of red clover are insured against drought and frost ⁽¹⁾.

The amount of the insurance varies in accordance with the region, the type of farm and the product insured, and is greatest in the case of collective farms and co-operative organizations; then follow the individual allotments belonging to members of the collective farms and lastly the individual farms ⁽²⁾.

The premiums vary with the regions where the insured products are grown, the type of farm and the form of insurance. Minimum premiums are paid by the collective farms and co-operative organizations; those paid for the individual allotments belonging to members of collective farms are higher and maximum premiums are paid by holdings of individual farmers; those paid for insurance against risk of damage by hail, torrential rains, storms and fire are lower than those for frost, water, flood and rot.

Special tariffs are in operation for special and industrial crops.

Premiums for the insurance of spring and winter crops are calculated for each farm on the basis of the crop plans and in the case of perennial crops on the basis of registered area at the time of insurance. Any area cultivated in excess of that fixed under the plan is exempt from payment of a premium. Compensation for loss is, however, made on the basis of actual area cultivated.

⁽¹⁾ SOBRANIE ZAKONOFF I RASPORIAJENII, No. 38, law of July 19, 1934.

⁽²⁾ FOREIGN AGRICULTURE, United States Department of Agriculture. Washington, September 1937, p. 448.

Southern hemp crops insured against damage from natural causes and the red clover seed crops insured against drought and frost are exempt from payment of a premium.

Special cases enjoy certain advantageous conditions. In the case of non-insurable damage, for instance, insured persons are partially exempted from the payment of premiums due for existing insurance; the amount of this reduction is fixed in accordance with the gravity of the damage and the loss involved and also in proportion to the resources of the farm; in no case may this reduction exceed 90 per cent. of the premium to be reduced.

Fifteen per cent. of the total amount of the premiums is earmarked for expenditure in campaigns against fire, flood and animal diseases as well as for insurance propaganda. Compensation is paid up to the full amount of damage suffered.

In cases of partial damage, the amount of compensation paid for loss may not exceed the proportional part of the capital insured.

No compensation is paid for losses due to the fault of collective farms, co-operative organizations, members of collective farms or owners of individual farms and clearly due to bad management, faulty measures for the protection of the cultivated land, neglect of the regulations for the prevention of fire or gross negligence with fire or to any deliberate act ⁽¹⁾.

Supplementary optional insurance of buildings and livestock within certain limits was introduced by a law promulgated on July 27, 1934, and was entrusted to the *Gosstrach* ⁽²⁾. This form of insurance was extended under the terms of a law dated September 17, 1935, to special and industrial crops, to garden crops and vineyards and to crops of vegetables and melons belonging to collective farms and primary co-operative organizations.

Optional insurance may be offered within the limits of the difference between the tariff fixed for compulsory insurance and the real total value of the crop calculated on the basis of prices fixed for deliveries, or else, in the case of crops for which no delivery price is fixed, the value is calculated on the basis of current prices.

The Finance Commissariat may fix premium rates for the various items covered by optional insurance lower than those ruling in the case of compulsory insurance ⁽³⁾.

In *Bulgaria* the insurance department of the Central Co-operative Bank in Sofia conducted hail insurance under a law promulgated on December 26, 1919 and modified and completed by the law of March 10, 1925. This department was empowered to handle frost insurance as a complementary branch of hail insurance as from 1926. All crops may be covered by this insurance, except fruit trees and vegetables. The insurance also includes risk of damage from late spring and early autumn frosts.

Vines and nurseries of American vines may be insured from March 15; insurance of other crops begins on May 1. ⁽⁴⁾.

(1) *SOBRANIE ZAKONOFF I RASPORIAJENII*, N. 38, law of July 19, 1934.

(2) *SOBRANIE ZAKONOFF I RASPARIAJENII*, N. 40, law of July 27, 1934.

(3) *SOBRANIE ZAKONOFF I RASPORIAJENII*, N. 51, law of September 17, 1935.

(4) *BANQUE CENTRALE COOPÉRATIVE DE BULGARIE*, insurance section, Sofia, 1927, p. 7.

Under the terms of Title V of the *Agricultural Adjustment Act*, voted by Congress on February 16, 1938, a Federal Crop Insurance Corporation was created in the *United States of America*; this Corporation was empowered, as from 1939, to insure wheat farmers against risk of loss of output due to drought; flood, hail, wind, winter damage, thunderbolt, cyclone, insect infestation, plant diseases and other cases of *force majeure* to be determined by the Board of Directors of the Corporation under the control of the Ministry of Agriculture. This insurance does not of course cover loss due to the fault of the farmer or as the result of failure to reseed in areas and under circumstances where this is customary.

The Corporation's capital has been fixed at 100 million dollars subscribed by the United States. Loss of capital may only be made good from the Corporation's operating profits.

Insurance covers a proportion of the known or appraised average yield of wheat during a given base period on the insured farm; the proportion is fixed by the Board at an amount varying between 50 and 75 per cent. of the yield thus established.

Premiums are payable in wheat or in its cash equivalent on the day of payment and are fixed by the Board on the basis of average losses of the wheat crop during a given period on the insured farm.

Compensation is payable either in wheat or in equivalent cash according to the rules drawn up by the Board.

An important provision of the law empowers the Federal Crop Insurance Corporation to purchase, handle, provide storage facilities for, insure and sell wheat and to meet all the outlay involved by these operations. Certain restrictions have, however, been placed on these powers. On principle, the Corporation cannot purchase wheat in excess of a sum equal to the cash premiums paid in by the farmers, unless to replace wheat which has been sold to prevent its deterioration. The Corporation may only sell wheat in so far as this is necessary either to cover compensation payments or to prevent the deterioration of the grain (*).

Crop insurance against risk of damage from natural causes was introduced in *Japan* by the law of April 2, 1938 and by the regulations for the application of said law, dated December 23, 1938. Agricultural associations established in towns, villages and hamlets were empowered under certain conditions and on a mutual basis to grant compensation for loss suffered by their members either in their crops or in the rents collected in kind.

The associations handling operations on a mutual basis in this branch of insurance have been authorized to form crop insurance associations; this is also the case for the primary silkworm breeding associations which have launched analogous mutual schemes for sericulture.

When necessary the competent Minister may order all persons with the requisite qualifications for membership to form a crop insurance association. When these persons do not comply with the order, the Minister himself drafts

(*) The application of the programme for wheat crop insurance in 1939 and 1940 has been discussed in a study by R. H. Saeids and H. Donoho, published recently in the *International Bulletin of Agricultural Law*, International Institute of Agriculture, 1940, No. 1.

the regulations and adopts all the other measures necessary for the formation of the association.

Crop insurance associations must form crop insurance federations to underwrite reinsurance in collaboration with the State.

The following crops may be insured: irrigated rice, mulberry trees yielding leaves for silkworm breeding, barley, naked barley, wheat, oats and lastly rents in kind from lands sown to irrigated rice. These crops however are not all insured against the same risks.

Rice is insured against wind, rain, drought, hail, diseases produced by the *Bacillus oryzae* due to wind and rain, the diseases produced by the *Helminthosporium oryzae* due to drought and scalding. Mulberry trees yielding leaves for silkworm breeding are insured against damage caused by wind and water, drought, frost and hail. Barley, naked barley, wheat and oats are insured against damage caused by wind and water, drought, hail, rain and moisture.

Rents in kind on farm lands sown to irrigated rice are insured against the same damage as the rice crop grown on these lands.

Members of a crop insurance association must operate the institution on a mutual basis for all the crops contemplated as a whole and under all circumstances which involve mutual liability as indicated and which are covered by the insurance conducted by the crop insurance association itself concerned.

The amount of the premiums to be paid by members is fixed by order, the State paying part of the insurance premiums of the members. The amount of insured capital and the percentage not covered by insurance are also fixed by order.

The crop insurance association may reduce the amount of compensation paid if its funds are not sufficient to cover the full amount.

Reinsurance premiums are fixed by imperial decree.

The amount of capital reinsured with the federation of crop insurance associations is equal to a certain percentage of the sum insured as determined by imperial decree. The total amount reinsured by the State is sufficient to cover extraordinary risks within the limits of the total amount of reinsurance carried by the federation in accordance with regulations issued by imperial decree ⁽¹⁾.

The State does not assume responsibility for a quota of reinsurance, but only for that part of the insured capital necessary to cover extraordinary risks, while the insurance federations are responsible for normal damage ⁽²⁾.

The law of 1938 provides for the imposition of penalties in cases where the members of a crop insurance association fail to carry out the necessary operations of manuring and caring for their crops, or if they do not take the necessary measures for preventing damage to crops. In such cases members may lose the right to compensation either as a whole or in part according to regulations established by order. Penalties are also imposed if the member does not comply with the instructions issued by the insurance association for the prevention of damage.

F. ARCOLEO

⁽¹⁾ Textes législatifs, N° 20, 1939. International Institute of Agriculture, Rome.

⁽²⁾ OBAMASCHI, in *Neumann's Zeitschrift*, March 22, 1929.

INTERNATIONAL CHRONICLE OF AGRICULTURE**ITALY**

In the last Chronicle concerning Italy, published in the February, 1940, number of this Bulletin, particular stress was laid, in connection with Italian economic conditions, on the general upward trend of wholesale prices. During the intervening period this trend has continued without interruption. A whole series of causes, both within and without the country has contributed to this movement in agriculture, industry and the various services. Among the reasons of an internal character, mention should be made of the measures adopted for the protection of agriculture and the development of production, together with those in favour of agricultural labourers (increased wages, social insurance, etc.). The external causes of this upward trend include the rise in the prices of raw materials; the increase in freight rates and maritime insurance; the export embargoes decreed by countries which, under normal conditions, export certain products and, lastly, the rise in the price of coal.

Retail prices have also shown an upward movement, especially as regards the principal articles of general consumption, and this has naturally affected the cost of living.

As regards agriculture in particular, the following table, compiled by the Italian Central Statistical Institute, shows index numbers of prices for products sold and articles purchased by farmers during a period of ten years. It is interesting to note the trend of agricultural prices, although figures are only available up to 1938.

From these figures it will be seen that the index numbers of prices of products sold by farmers declined by 40 per cent. during the period between 1929 and 1934, while those of articles purchased declined by 27.8 per cent.; between 1935 and 1938, on the other hand, they registered an increase of 49.5 per cent. and 30.9 per cent. respectively. It may therefore be concluded that the rise in the prices of products sold by farmers is almost 20 per cent. more than the rise in the prices of articles purchased by them.

In order to neutralize to a certain extent the effects of the depression and to improve market conditions, a system was adopted by which the prices particularly liable to fluctuations were made subject to periodic revision and the prices of certain foodstuffs fixed for a given period. The basic idea of these measures is to establish equilibrium between prices and wages by fixing the price of certain necessities. As regards agricultural products, the Central Corporative Committee decided therefore to fix prices at the following maximum levels: (1) in the case of cattle the price was increased from 4.10 lire to 5 lire per kg. live weight on the primary market (prime beef with a yield of 52 per cent.); proportionate increases were authorized for other qualities; (2) in the case of pigs, the price was increased from 6.30 lire to 7.30 lire per kg. live weight on the primary market, with a further increase of 0.20 lire per kg. for special breeds; the price of milk for industrial purposes was raised from 84 to 104 lire per quintal, while the price of milk for direct consumption was raised proportionately; (3) the increase in the price of bacon and lard was proportionate to that of pig meat; (4) in the case of cheese and butter the increase authorized was in proportion to that in the price of milk.

The principle inspiring the price policy described above consists in keeping the authorized increases strictly within the limits indispensable to the progress of production, so that the consumer only carries the burden of the expense which production cannot reasonably shoulder.

Index numbers of prices of products sold and articles purchased by farmers in Italy.

(1928 = 100)

| Year | Products sold | | | | Products and utilities sold | | | | | | Ratio between the general indices of prices of products sold and purchased by farmers | | |
|-----------|---------------|---------------------|-------------------------|---------------------|-----------------------------|-------------------------------|------------------------|---|-------|-------|---|-----------------------------|------------------------------|
| | General Index | Vegetal products | | Animal Products | General Index | Fixed and circulating capital | | | | Wages | | Retail purchase of products | |
| | | for alimentary uses | for non-alimentary uses | for alimentary uses | | for non-alimentary uses | Agricultural machinery | Chemical and anti-cryptogamic fertilizers | Seeds | | | | Feeding stuffs for livestock |
| 1929. . . | 93.0 | 89.4 | 93.6 | 103.0 | 89.2 | 96.6 | 100.8 | 97.5 | 96.5 | 99.3 | 105.0 | 98.0 | 93.8 |
| 1930. . . | 80.2 | 76.6 | 79.9 | 92.1 | 93.1 | 94.5 | 96.0 | 81.9 | 76.7 | 95.1 | 104.5 | 92.9 | 86.1 |
| 1931. . . | 69.0 | 68.3 | 67.3 | 73.4 | 82.7 | 89.7 | 84.7 | 69.4 | 65.2 | 83.6 | 92.3 | 83.8 | 83.4 |
| 1932. . . | 65.0 | 66.6 | 56.2 | 63.7 | 77.7 | 87.6 | 79.3 | 73.6 | 68.9 | 78.5 | 84.7 | 76.4 | 83.7 |
| 1933. . . | 55.4 | 53.4 | 65.6 | 61.0 | 73.7 | 84.6 | 76.6 | 64.3 | 55.2 | 75.3 | 80.1 | 73.8 | 75.2 |
| 1934. . . | 55.8 | 55.9 | 66.5 | 57.3 | 71.6 | 82.9 | 71.8 | 65.2 | 56.9 | 72.5 | 80.7 | 71.8 | 77.9 |
| 1935. . . | 64.5 | 66.2 | 72.7 | 60.8 | 73.8 | 84.0 | 71.5 | 75.4 | 73.6 | 74.9 | 85.2 | 71.8 | 87.4 |
| 1936. . . | 70.0 | 68.6 | 76.7 | 73.8 | 79.9 | 92.6 | 77.8 | 86.3 | 82.0 | 87.8 | 98.0 | 73.1 | 87.6 |
| 1937. . . | 82.8 | 79.8 | 76.9 | 92.2 | 89.5 | 107.1 | 94.2 | 85.0 | 83.6 | 102.1 | 116.8 | 78.9 | 92.5 |
| 1938. . . | 96.4 | 86.0 | 82.1 | 88.4 | 96.6 | 117.0 | 100.6 | 97.0 | 93.9 | 114.3 | 127.2 | 83.0 | 99.8 |

As soon as an abnormal rise in the price of essential foodstuffs had been prevented, an attempt was made to adjust the relations between the prices of various products, in order to avoid placing certain branches of production in a privileged position compared with others. A Committee for the co-ordination of home prices was accordingly set up in order to adjust the prices of various agricultural products and thus to insure balance on the market.

Lastly, with a view to maintaining a balance between prices and wages, an increase was made in the latter. Increases varying from 12 to 15 per cent., according to the several categories, were therefore authorized on all wages paid to agricultural labour.

Policy affecting agricultural production and marketing.

Pooling of agricultural products. — The pooling and collective sale of products, with a view to ensuring that farmers obtain steady and remunerative prices, now applies to 14 different products in Italy.

During the 1939-40 season producers received 9,553 million lire for products pooled up to and including March 31, 1940. These included wheat, maize, bran, rough rice, olive oil, wool, silk cocoons, hemp, cotton, saffron, essence of bergamot and manna.

The total amount legally retained for the operation of the pools came to 532 million lire, 205 millions representing interests on the sums advanced by the financing institutions; 42 millions for equipment and 285 millions for operating expenses. The latter represent 2.98 per cent. of the amount received by the producers and include warehousing, conservation, insurance of the products and general expenses for management. For instance, in the 1936-37 and 1937-38 seasons the financing of the wheat pool involved advances respectively of 2,667,387,000 and 3,784,121,000 lire paid on wheat delivered to the pooling organizations.

The cereal market. — During a recent meeting the Cereal Corporation decided to adopt every possible measure to bring the wheat output up to 90 million quintals as quickly as possible. During the period from 1937 to 1939 the average annual output has been 80 million quintals. The problem of drafting a self-sufficiency programme for the cultivation of pulse was then discussed. The average output of these crops for the period 1936-38 was approximately 9.5 million quintals, obtained from an area of 1.4 million hectares. As this output is insufficient, the Corporation has recognised the need to guarantee a remunerative price for these products in order to encourage increased production.

Compulsory pooling of oats was instituted by the Act of July 12, 1940, No. 1171 (¹), and includes both home-grown and imported oats. An advance of 135 lire per quintal is made on the delivery of this product to the pooling organizations.

Subsidies for the construction of silos and warehouses for cereals and other agricultural products. — The policy adopted in Italy for the protection of the agricultural markets presupposes the existence of various installations for preserving and handling the products whose sale is effected gradually. Since the cost of building these establishments is high, their construction is often beyond the means of private enterprise and it has been found that State aid is indispensable. The first law contemplating assistance in the construction and equipment of silos and warehouses for cereals was passed on May 30, 1932 (No. 720). This law authorized the Minister of Agriculture to grant subsidies to interested parties amounting to 25 per cent. of the estimated cost; in cases where it was found necessary to have recourse to credit, a contribution

(¹) *Gazzetta Ufficiale del Regno d'Italia*, No. 199, August 26, 1940.

towards the payment of interests on 50 per cent. of the estimated outlay was also authorized to the extent of 2.5 per cent. per annum for a period not exceeding 25 years. The sum of 2 million lire per annum appropriated for this purpose for the next 25 years was raised to 3 millions in 1933 and to 4 millions in 1935. The steady progress of these constructions, however, especially as a result of the measures adopted in connection with compulsory pooling of wheat, rendered necessary a further increase in this fund, as contemplated in law No. 325, April 8, 1940⁽¹⁾. The appropriation now amounts to 4 million lire per annum for 25 years allotted to subsidies for the construction of silos and warehouses for the storage of cereals, plus one million per annum for thirty years to subsidise the erection of fodder silos and warehouses and the purchase of equipment for preserving fruit and vegetables and handling them at the farm.

The cattle market. — Several measures have been adopted in Italy during the past few years in order to eliminate the shortage of home-produced meats and fats. In the first place remunerative prices have been guaranteed to producers mainly through the organization and control of the principal cattle markets and by the installation of refrigerating plant for the preservation of quantities of meat temporarily in excess of demand. This form of storage has been facilitated by the establishment of slaughterhouses equipped with refrigerating plant in the largest livestock producing areas. Imports and sales of foreign livestock and meats within the country have also been organized and regulated. The chief cause of the shortage mentioned above depends, however, on the insufficiency of fodder and the extreme instability in its production. Although the yield is high in Northern Italy, rising to as much as 100 quintals per hectare in the case of hay, very small quantities are produced in the south and on the Islands. Natural meadows in these regions only yield from 5 to 6 quintals of hay per hectare. This explains the wide fluctuations observed in the number of head of livestock; for instance, the number of cattle per square kilometer of farm land varies from 64 and 57 head in Lombardy and Emilia to 10, 8 and 7 head in Sardinia, Calabria and Sicily respectively.

Consequently, when remunerative prices have been assured for cattle, it became necessary to increase the supplies of feeding stuffs. Besides the execution of important irrigation schemes for the more intensive cultivation of fodder crops, which will be discussed below, plans are now in course, therefore, for the gradual conversion of a large area of permanent meadows and pastures (occupying over 5,500,000 hectares), into artificial meadows, as well as for the improvement of mountain grazing.

At the same time, in those areas where livestock is most plentiful, special efforts are to be made for the improvement of breeds of animals in order to obtain better yields in meat, fats, milk and wool. A sum of 300 million lire has been appropriated for this purpose, distributed over a period of ten years (law No. 627, May 27, 1940)⁽²⁾. One half of the annual quota of 30 millions will be used for the encouragement of stockbreeding, and the remainder for developing the cultivation of fodder crops.

Textile market. — Pooling and collective sales of products have been adopted on the textile market for hemp, wool, silkworm cocoons and cotton. The organization of pooling was modified by the law No. 355, April 8, 1940⁽³⁾. Among the changes introduced is the recognition of the right of the person delivering the wool to receive immediately 95 per cent. of the assessed price of the product; the remaining 5 per cent. is paid into a reserve fund to cover possible losses to the management; when accounts are closed any balance remaining in this fund will be distributed among the

⁽¹⁾ *Gazzetta Ufficiale del Regno d'Italia*, No. 107, May 7, 1940. — ⁽²⁾ *Gazzetta Ufficiale del Regno d'Italia*, No. 148, June 25, 1940. — ⁽³⁾ *Gazzetta Ufficiale del Regno d'Italia*, No. 11, May 14, 1940.

persons who delivered the wool in proportion to the value of the wool delivered. The price of wool (first quality Apulian), was raised to 35.30 lire per kg. for the 1940 season.

In order to stimulate production of silkworm cocoons the price for the 1940 season has been fixed at 15 lire per kg. of fresh cocoons; the price of first grade home-grown cotton has been raised from 15.95 to 22 lire per kg.

The number of firms engaged in the Italian textile industry at the end of 1938 was 6,175 with 627,343 branch organizations.

Altogether 261 million kilogrammes of textile fibres were produced in Italy in 1938; the fibres, supplied partly from home production and partly from imports and totalling 373 million kilogrammes, were all absorbed by industry during the same year. Of this quantity 251 million kilogrammes, were used for the production of manufactured goods for consumption within the country, while 122 million kilogrammes were used for the manufacture of goods for export.

The textile fibres produced in Italy in 1938 were distributed among the various categories as follows:

| | | |
|------------------------|----------------|--|
| a) animal fibres: | | |
| wool | 11,375,000 kg. | |
| silk | 1,980,000 " | |
| b) vegetal fibres: | | |
| flax | 3,800,000 kg. | |
| hemp | 108,600,000 " | |
| cotton | 9,500,000 " | |
| c) artificial fibres: | | |
| rayon yarn | 45,996,100 kg. | |
| rayon staple | 75,681,500 " | |
| lanital | 1,685,000 " | |
| sundry waste | 3,151,400 " | |

The following table shows the trade balance of the principal textile fibres and their products for 1938, in millions of lire:

| | Silk | Hemp, flax, jute | Cotton | Wool | Artificial fibres |
|-------------------|---------|---------------------|-----------|---------|----------------------|
| Imports | 48,553 | 134,036 | 903,171 | 502,470 | (1) 309,450 |
| Exports | 307,845 | 374,657 | 1,013,650 | 497,580 | 808,917 |
| Active | 259,292 | 240,621 | 110,479 | — | 499,461 |
| Passive | — | — | — | 4,890 | — |

The total foreign trade in fibres and textile products during the year under review amounts to 3,242,379,000 lire for exports and 1,927,864,000 lire for imports, with an active balance of 1,314,515,000 lire.

Regulation of supply and demand. — In order to combat any individualistic abuses or any speculative manoeuvres which might occur under present conditions and hamper the regular operation of the markets, two services have been created (decree law No. 2222, December 18, 1939 (2)), one for the supply and the other for the distribution of foodstuffs. The former has its headquarters at the Ministry of Agriculture and Forests and its task is to register the quantities of foodstuffs existing in the country, purchase and if necessary requisition foods, livestock and fodder, fix the percentage of merchandise which may be exported, etc. The latter service, with headquarters at the Ministry of Corporations, regulates consumption according to the requirements of the country and the available stocks of home-grown and imported products. This service will also control the distribution of wheat, flour, oils and fats,

(1) Including cellulose. — (2) *Garzetta Ufficiale del Regno d'Italia*, No. 78, April 2, 1940.

sugar, wool, cotton, hides, etc. among the respective industries. Lastly, it will keep a close watch on prices.

New irrigation schemes. — Irrigation is one of the various measures adopted in the course of integral land reclamation which have proved most efficacious in intensifying the cultivation of crops and in increasing the yield. In certain areas irrigation has led to the following increases in the gross yield in lire per hectare: right Sele: 5,618 lire; plains of Catania: 3,227 lire; plains of Pisa: 2,671 lire; Lomellina: 2,380 lire; Brescian plains: 2,044 lire. But the need for irrigation is felt in Italy especially as regards fodder crops, which are intended, through an increase in the number of head of livestock, to supply the greater part of the meat and fats required to feed the nation.

The irrigated area has increased in Italy from 1,440,000 hectares in 1930, to 2,025,030 hectares in 1938.

A new impulse has recently been given to irrigation schemes. The regulation of the waters of the Lakes Maggiore, Como and Garda will place some 200 cubic metres of water per second at the disposal of agriculture in the plain of the River Po.

Under law No. 1002, June 22, 1939, the sum of one thousand million lire was appropriated on the State budget for subsidising irrigation works for a total value of over 1,500 million lire; it will thus be possible to irrigate a new area of over 500,000 hectares. Out of the above sum, 200 million lire will be used to subsidise new rural water supplies.

The most important scheme contemplated is the construction of a canal, 184 km. in length, to distribute water throughout the whole dry region of Emilia and Romagna; when this scheme is complete 325,000 hectares of land will be supplied with abundant water (¹).

A revision of the quantities of water supplied has also been arranged; superfluous water will be taken from areas with redundant supply for distribution to areas where water is scarce.

G. COSTANZO.

BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS

O'DONOVAN, John, *The economic history of live stock in Ireland*. Cork University Press, Educational Co. of Ireland Ltd, Dublin.

[This book deals in great details with the history, the present situation and the future policy of animal husbandry in Ireland. The first part of the book is concerned with the many vicissitudes of the economic history of Irish agriculture, which has always been directed, since its most ancient times, towards animal production and the export of animal products to Great Britain. This part of the book presents considerable interest and abounds in references to sources relating to the history of agriculture.

Referring to the present condition of animal husbandry, the A. points out that it accounts for more than 70 per cent. of the total income derived from agriculture in Ireland. The A. examines the objections frequently raised against the too exclusive character of Irish agriculture and finds that they are not well founded. He puts forward some evidence in support of his contention.

The present tendency of cattle breeding aims at a combined output of meat and milk, the two representing roughly equal shares in the total value of production. Measures taken for the improvement of the fattening qualities must, therefore, for economic reasons, go hand-in-hand with those aiming at the increase of the yield of milk. Only this will enable animal production in Ireland to compete with that of other countries on the British market.

(¹) Cf. the length of other irrigation canals in Italy: Lanza canal, 13 km.; Brentella di Pederobba, coming from the Piave, 28 km.; De Pretis, from the Dora Baltea, 30 km.; Ledra Tagliamento, 45 km.; Naviglio d'Ivrea, from the Dora Baltea, 50 km.; Muzza, from the River Adda, 55 km.; Villoresi, from the Ticino, 75 km.; Cavour, from the Po, 80 km.

The A. also lays stress upon the remarkable stability of live cattle exports to Great Britain, which has lasted almost a century, whereas all the former competing countries—the United States of America, Canada, Argentine and the Netherlands—have been compelled for various reasons to discontinue their exports.

The future prospects of fat cattle exports are not so good, as they are unfavourably affected, on the one hand, by the low prices current on the British market during the season when cattle is brought back from grazing in autumn, and on the other hand by the scarcity and the excessively high prices of concentrated fodder.

The export of dairy produce, at present very small, could be increased, according to the A. opinion, but this would require a more extensive organisation of dairies, and particularly of creameries. The same applies to the export of bacon, which depends upon the provision of better equipped bacon factories.

In his concluding remarks O'Donovan expresses the opinion that any future intensification of Irish agriculture would involve a fundamental revision of the existing system of cultivation, with a view to increasing the production of fodder. The intensification of production would necessitate, among other measures, the wider inclusion of fodder roots in the rotation and the use of wheat for feeding purposes!:

J. Z.

SCHEIDER, Kurt, *Deutschlands Gemüseversorgung mit Kopfkohl und Sauerkraut*. Berlin, Verl. für Sozialpolitik, Wirtschaft und Statistik, 1939, 454 S. RM. 16.

The consumption of cabbage, either in form of Sauerkraut or as green vegetable is a very important factor in the food economy of the German people. It is therefore not astonishing that special studies are devoted lately not only to the conditions of production in this particular field of horticulture, but to the organisation of the market as well (!). In view of the far-reaching reorientation of production caused by the present tendency towards self-sufficiency, as well as of the structural changes in the conditions of the market, due to the marketing regulations, a monograph like Dr. Kurt SCHEIDER'S book deserves all our attention. The essential part of the monograph is based on a great wealth of statistical material. The A. has not only availed himself of the German official statistical data on horticulture, in which considerable progress has been made during the last years, but he made use, primarily, of original data concerning German-Dutch and German-Italian transit of merchandise on border stations, further, of statistical material on transport of cabbage on German railways for the home market, data referring to the cabbage supply of Berlin and other material regarding consumption and prices. Thus, from the material obtained emerges a very complete record of the production and marketing of cabbage in Germany. The text is illustrated with carefully drawn-up statistical tables and numerous cartograms and diagrams, and it may be said that this book may stand as a model of a specialized scientific study on market organisation. The stress laid on the geographical conditions of cabbage production and transport should also supply the agricultural geographer with much instructive information. The student of business fluctuations will find ample material on the movement of cabbage prices, and the person concerned with commercial policy may find detailed information on the diminution of the formerly large cabbage imports from the Netherlands and Italy. Moreover, the book is not concerned with cabbage proper alone, but also contains information on cauliflower, red cabbage and Savoy-cabbage. In a special chapter devoted to the industrial transformation of white cabbage and the Sauerkraut-industry detailed information is given on the problems of the localisation and of the business organisation of this industry. In the final chapters a thorough account is given of the influence exercised by the creation of the "Reichsnährstand" and the introduction of marketing regulations on the cabbage market, as well as of the incorporation of cabbage and Sauerkraut-industry into the system of food economy controlled by the State.

The very clear presentation of such a vast material deserves special comment, because the difficulties of collecting and analysing statistical information are far greater with regard to the production and commerce of vegetables than with regard to the major agricultural crops. In this particular case of cabbage production we must, for example, distinguish between small garden production for family consumption, com-

(!) Other studies of this type: MENCK, Werner. *Erzeugung und Absatz von Weisskohl in Deutschland*. Königsberg, 1932, 201 p. — OHNESORGE, Meinhard. *Kopfkohl, Anbau und Markt*. Berlin P. Parey, 1934, 81 p. (Ber. d. Landw., 101 Sonderheft).

mercial horticulture proper, cultivation of cabbage by the small farmer, not intended essentially for the market, and, at last, large-scale production of field vegetables. No less intricate are the conditions of the market and marketing, the new organisation of which by the "Reichsnährstand" is certainly the outcome of an imperative necessity. A bibliography and a table of contents would have been a desirable addition and would have increased the usefulness of the book]. S. v. F.

**NEW PERIODICALS RECEIVED BY THE LIBRARY
OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE
for the third quarter of 1940 (*).**

- ALBANIA...; rivista mensile di politica, economia, scienze e lettere. Roma, v. 1 (1940)-, mens. L. 100 int.; L. 200 étr. [Second title in Albanian: Shqipëri.] [Text or summaries occasionally in Albanian].
- BAHIA rural; organ da economia bahiana. Bahia, v. 5 (1938)-, mens. 258000 int.; 308000 étr.
- BESTEMMELSER av Administrasjonsrådet. Oslo, 1940-, irr. [Formerly: Norsk lov-tidende].
- BOLETÍN bibliográfico. Buenos Aires, Biblioteca, Dirección de propaganda y publicaciones, 1936-, mens. (República Argentina. Ministerio de agricultura de la Nación).
- BOLETÍN tabacalero internacional. [Habana], v. 4 (1939)-, mens. (Comisión nacional de propaganda y defensa del tabaco habano. Departamento de estadística). [Mimeographed].
- BRÉSIL. Inspeção federal de obras contra as secas. Boletim..., Rio de Janeiro, v. 10 (1938)-, trim. (Ministerio da viação e obras públicas).
- INTERNATIONAL bulletin of agricultural law. Rome, v. 1 (1940)-, irr. Lit. 45 int.; \$ 2.35 étr. (International Institute of Agriculture).
- OGORUL românesc; organ saptamanal de propaganda și popularizare agricola. București, Ministerul agriculturii și domeniilor, v. 1 (1939)-, hebd. [Rumanian land].
- OSTSEE-ZEITUNG. Tallin, Tallinna kirjastus-ühisus, v. 1 (I.VI.1940)-, q. Ls. 33.60 int.; RM. 24.- étr.
- PLANTERS gazette and annual; dedicated to the cause of planters and planting in India. Calcutta, v. 1 (1939)-, mens. Rs. 6/- int.; 15s. étr.
- REVISTA mexicana de sociología; publicación del Instituto de investigaciones sociales de la Universidad nacional. México, v. 1 (1939)-, bimestr. \$ 1.00 le n°.
- RIO DE JANEIRO. Instituto do açúcar e do alcool. Boletim..., Rio de Janeiro, v. 1 (1938)-, bimens. (Secção de estatística do Instituto do açúcar e do alcool).
- RIVISTA bancaria delle assicurazioni e dei servizi tributari. Confederazione fascista delle aziende del credito e della assicurazione. Roma, v. 21 (1940)-, mens. L. 50 int.; L. 100 étr. [Formerly: Rivista bancaria - Minerva bancaria].
- SUPPLEMENTO statistico ai Nuovi problemi di politica, storia ed economia edito a cura delle Università di Padova, Palermo e Ferrara. Ferrara, v. 1 (1935)-, 4 fois p. a. (previous to 1938 irr.). L. 50 int.; L. 75 étr.
- TIERRAS y aguas; órgano de los Departamentos de tierras y aguas. [Bogotá], Ministerio de la economía nacional, v. 2 (1939)-, mens.

(*) List of abbreviations: bihebd. (biweekly); bimens. (twice monthly); bimestr. (every two months); déc. (every ten days); étr. (foreign price); fasc. (copy); hebd. (weekly); int. (home price); irr. (irregular); mens. (monthly); no. (number); N. S. (new series); p. a. (per annum); q. (daily); sem. (half yearly); s. (series); trihebd. (every three weeks); v. (volume); trim. (quarterly).

N. B. — Between brackets [] are given translations and explanatory notes not appearing in the title of the review.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

RECENT CHANGES IN THE EUROPEAN LAND SYSTEMS AND THEIR ECONOMIC AND SOCIAL CONSEQUENCES

CONTENTS: *Introduction.* The importance of the land system in the social organization. - 1. *Transformation of the land system for the purpose of encouraging the creation of small peasant farms.* 1. Agricultural property and the farm holding. Difference between the two notions from the economic and social points of view. Examination of the statistical inquiries on agricultural landownership carried out in different countries. 2. Large and small farms in economic theory and in agricultural practice. 3. Changes in the agrarian structure of the countries of Western Europe. General observations. Land settlement in England and Wales, Scotland, Ireland, France, Germany, Italy. 4. Development of small peasant ownership in the countries of Northern Europe and in Switzerland. 5. The countries of agrarian reform. 6. Tenant farming in European agriculture. 7. Comparison of the agrarian structure of the countries of Western Europe.

Introduction.

The land system is undoubtedly one of the most characteristic aspects of the progress of social life. The way in which colonization developed at the outset, whether in the form of villages with the land broken up into scattered strips (*Gewannsdörfer*), as in the German colonies, or in villages closely resembling towns, such as those which grew up in the course of Roman settlement, where the stone houses were built side by side in rectangles measuring two hundred *juggera*, or again, in the case of the Slav colonies, where the villages were built in circles, each farm being surrounded by its own property consisting of a single unbroken piece of land; the farming methods adopted; the system of succession laws for landed property, etc.; such are the factors which form the basis of the juridical and economic conditions and determine the social policy of a given historical period.

In the following pages a study will be made of the general principles governing the agrarian structure in Europe, or, in other words, of the foundation on which the distribution of farms ultimately depends; the main juridical types of farm tenure will be examined, together with the most important measures adopted in the field of agrarian policy concerning the creation and conservation of farms; agricultural succession laws now in force will also be studied, together with the economic and social effects of the different land systems, etc.

In 1939 the International Institute of Agriculture published a special Report on European land systems for presentation to the projected European Conference

on Rural Life ⁽¹⁾. In this Report, however, the subject was dealt with from a standpoint slightly different from that adopted in the present study. In that Report Europe was divided into three main zones:

- (1) The land settlement zone, in which the land systems have been developing by way of gradual evolution: Western and Northern European countries.
- (2) The zone of agrarian collectivism introduced by revolutionary means: Union of Soviet Socialist Republics.
- (3) The zone of agrarian reform: all Central and Eastern European countries. Owing to their geographic situation and land systems, these countries occupy an intermediate position between the first two categories.

An attempt was thus made to establish a kind of economic geography for the various forms of agrarian organizations in Europe and to group them systematically.

Without overlooking these fundamental principles, an analysis has been made in the present work of the changes which have occurred in European land systems on the basis of the various juridical, economic and social criteria, which, when synthetized, reveal the outstanding features of the agricultural constitution of contemporary Europe.

The following study is divided into three parts: I. Formation of small holdings; II. Conservation of small holdings and III. Economic and social consequences of a given land tenure system.

I. — Transformation of the land system for the purpose of encouraging the formation of small peasant farms.

I. — Agricultural property and the farm holding.

When analysing the agricultural structure of Europe a clear distinction must be made between the idea of agricultural property and that of farm holding. A study of the ownership of land applies chiefly to the economic and social aspect of the problem; it indicates the way in which the land is distributed among the various social classes, showing whether it is widely distributed or whether it is concentrated in the hands of a few large landowners.

On the other hand, in speaking of the distribution of farm holdings, it is rather the economic and technical aspect of the agricultural organization which is being considered; a relation is established between man and the land, the farmer having rights only in the product of his labour, while the soil itself, as a means of production in the agricultural process, and the income therefrom, belong to the landowner.

A confusion of these two terms, which are certainly not synonymous, will suffice to distort the nature and the very essence of the agrarian structure in a given country.

⁽¹⁾ "The European Land Tenure System", in the volume: DOCUMENTATION FOR THE EUROPEAN CONFERENCE ON RURAL LIFE. International Institute of Agriculture, Rome, 1939.

In spite of the importance of this question, and although the distribution of the soil has a decisive influence on the economic and social policy of every country, it is nevertheless true that the information available on this subject is very incomplete. Agricultural censuses undertaken in the various countries offer very valuable information on the situation of farms and on the manner in which they are distributed among the rural population. Wherever farming ownership largely predominates, as is the case, for instance, in Ireland, Denmark, Germany, Norway, Sweden, Switzerland and in some Eastern European countries where agrarian reforms have been carried out, the distribution of farms tends increasingly to assimilate the distribution of landed property. In no case, however, are they exactly similar.

The essential difference between the statistics of farms and those of landed property is due to the fact that the former are based on the individual farm, while the latter consider the subject from the standpoint of the landlord as an individual.

Official statistics of landed property are almost non-existent. In *England*, the only census of this kind was taken in 1873. It is known as the *New Domesday Book* and was published under the title of *Return of Owners of Land in England and Wales*. The intention was to obtain exact information concerning the number of landowners, which, since 1816, had been estimated at some thirty thousand. The census showed that in 1873 there were in England and Wales 973,836 landowners.

In 1870, almost simultaneously with the above census of landed property, it was found that the total number of farms in England and Wales was 449,547, or roughly 50 per cent less than the number of landowners. From this it may be presumed that some of the landowners must have been registered twice, or that in many cases a single farm belonged to two or more landowners.

However this may be, this census did not contribute much towards an exact knowledge of the distribution of landed property in England between 1870 and 1880, *i. e.*, during the great agricultural crisis in Europe.

As regards official statistics concerning landed property, *France* is in no better position than most of the other European countries. Here the first apportionment of land quotas, *i. e.* of the shares of the land tax which the landowners had to pay to their communes, was carried out as early as 1816, and the first set of agricultural statistics was compiled in 1840. Agricultural censuses were again taken in 1852, 1862, 1882 and 1892. The last was taken in 1929. Each of these censuses was however made according to different standards and, moreover, they all considered as unit the farmer as distinguished from the landowner.

No comparison can therefore be made between these censuses, especially as regards landed property. The 1892 census, for instance, the last but one to be made, puts the number of farms at 5,702,732. According to the system adopted in this particular census, this figure should coincide with that of landowners. As a matter of fact, however, according to the population census taken at the same time, the number of landowners is considerably lower, namely 4,193,739 and consequently almost one and a half million less than the figure for farms.

* *Ec. 10 Ingl.*

The number of farms resulting from the statistics of farms in 1929 totalled 3,906,439, while, on the basis of the population census, the number of people at the head of agricultural and forestry establishments was 4,665,775 in 1931. In both cases a wide difference is found between the number of farms and that of owners; in the first instance (1892), the difference favours the farms, while in the second case (1929), it is in favour of landowners.

In a study on "Changes in Land Tenure in France during the past century", published in *L'Economiste Français* (¹), M. Arthur Girault makes the following observations: "Are there many more rural landowners in France today than there were a century ago? Are the allotments more numerous, the estates more scattered? To what extent has the land changed hands, or has it remained in the same families? All these questions obviously arouse the curiosity of notaries and rural landowners who, during their lonely walks across the country, ponder over the economic and social problems connected with their interests."

It is unfortunately difficult to answer these questions. It is true that there is a land register, but it has remained unchanged since its institution. This document possesses great historical interest, but as a basis for comparison it is useless. It shows the point of departure, but not that of arrival.

In Russia official statistics concerning landed property were compiled between 1877 and 1880 in order to discover the influence of the liberation of the peasants (1861) on the movement of rural property. This census is, however, only of historic value to-day, because since then agricultural conditions in Russia have twice undergone far-reaching transformations. The first of these, which took place in 1906, was due to the agrarian reforms introduced by Stolypine, who abolished the primitive socialism of the village structure (*Mir-Obshtina*), introduced at the emancipation of the peasants, and encouraged the rapid evolution of peasant farming towards a system of private ownership.

The most violent upheaval which has ever occurred in agricultural conditions, whether in Russia or elsewhere, was, however, caused by the agrarian revolution in 1917. Private land ownership was completely abolished; the soil as a whole was nationalized and peasant farms, which at that time numbered some 25 millions, eventually were merged into collective farms (*Kolkhozes*). This had only some superficial likeness to a return to the old *Mir* organization, because, although it is true that at the present moment the land belongs to the commune, or rather to the State itself, it is no longer cultivated by the peasants individually, but is farmed in conformity with the methods adopted in co-operative enterprises. There is practically no social continuity between the evolution of the contemporary agrarian structure in the U. S. S. R. and that which existed in Russia prior to the war of 1914-1918. The only landowner is the State, which gives the land in hereditary use to the peasants.

In Germany the first official census of agricultural and forest property, which was very detailed, was made in 1937; the results were partially published at the end of 1939 and the beginning of 1940. It was found that the former territory of

(¹) No. 40, Paris, October 4, 1924.

the Reich used for agricultural and forestal purposes totalled 44 millions of hectares, of which 13.2 million hectares, or 30 per cent., belonged to public or private corporations, companies, etc. (juridical persons and associations of persons), while 30.9 million hectares or 70 per cent. of the total area belonged to individuals.

This second group of properties, which is of particular interest in the present study, was divided into two sub-groups: properties belonging to individuals with a total area of less than 20 hectares and properties with an area of 20 or more hectares. The former sub-group contained 4,524,636 farms with a total area of 13,639,511 hectares. In the case of these farms the census officials did not calculate the number of owners since this was considered to be practically equal to the number of farms.

The census offers some very interesting information in connection with the second sub-group consisting of properties and farms with an area of 20 or more hectares, which cover a total area of 17,270,080 hectares. In the census this total area was subdivided into various sizes according to the area covered by the property and a comparison was made between the distribution of rural property and that of the farms, as shown in the following table (¹).

TABLE I. — *Agricultural and forest property belonging to private individuals with a total area of 20 or more hectares.*

| Size classification on a basis of area | Number of | | Total area (hectares) |
|--|------------|---------|--------------------------|
| | landowners | farms | |
| From 20 to 50 hectares | 238,044 | 242,214 | 7,160,400 |
| " 50 " 100 " | 48,343 | 51,361 | 3,215,211 |
| " 100 " 200 " | 11,220 | 12,868 | 1,498,205 |
| " 200 " 500 " | 4,740 | 6,327 | 1,479,008 |
| " 500 " 1,000 " | 1,827 | 3,087 | 1,277,220 |
| " 1,000 " 2,000 " | 878 | 2,370 | 1,105,166 |
| " 2,000 " 5,000 " | 257 | 2,441 | 831,669 |
| " 5,000 " 10,000 " | 64 | 1,271 | 335,420 |
| " 10,000 hectares and over | 26 | 1,102 | 391,562 |
| Total | 305,408 | 323,047 | 17,270,080 |

As may be seen from the above table, the total area of 17,270,080 hectares belonging to 305,408 landowners is divided into 323,047 farms. The total number of owners is therefore lower than that of the farms and the agricultural property is therefore more concentrated than would appear from the distribution of farms. This difference leads consequently to the supposition that statistics concerning farms must be accepted for what they are worth when considering the distribution of agricultural property.

(¹) *Wirtschaft und Statistik*, published by the Statistical Office of the Reich. Nos. 7-8, Booklets 1 and 2, April, 1940, p. 117. Berlin.

This difference between the number of owners and the number of farms is all the more striking when one considers the relations between these two factors in the various size groups. It will be found that in each of the nine size groups which appear in the above table, the number of owners is always lower than that of farms and that, as the area increases, this difference becomes increasingly marked.

In the first two groups of "peasant" (*Bauer*) farms and "large peasant" (*Grossbauer*) farms with an area varying between 20 and 50 hectares and 50 and 100 hectares respectively, the difference between the number of owners and farms is still fairly low; for every 100 owners there are 102.5 farms, which means that out of the total number of farms in this class, only 2.5 per cent. belong to proprietors who each own more than one farm.

In the third class with an area varying between 100 and 200 hectares, the difference between the number of farms and the number of landowners is already more pronounced, there being 115 farms for every 100 owners. Consequently, 15 per cent. of the farms in this class belong to owners with more than one farm.

In the fourth group, which included farms with an area varying between 200 and 500 hectares, there are 100 owners to every 134 farms; in the fifth group, comprising farms whose area varies between 500 and 1,000 hectares, the number of farms corresponding to every 100 owners is 169; in the sixth group (farms from 1,000 to 2,000 hectares in area), there are 271 farms, which means that the number of these is almost three times as large as that of the owners; in the seventh group, comprising the farms with an area of from 2,000 to 5,000 hectares, there are as many as 950 farms for every 100 owners; in other words, every landed proprietor owns an average of 9.5 farms. In the eighth group, covering farms with an area varying between 5,000 and 10,000 hectares, there are only 64 landowners, who jointly own 1,271 farms. The average number of farms belonging to each owner is therefore 20.

Finally, in the last group, which includes the largest farms (10,000 hectares and over), there are only 26 owners with 1,102 farms covering a total area of 361,562 hectares. On the average every landlord in this group owns more than 45 farms with an average area of 14,000 hectares.

From the above examination of the statistics of agricultural landed property it appears that even in Germany, where the farms managed by the landlord himself comprise about 90 per cent. of the whole agricultural area (1933), the distribution of farms, as shown by the farm census, is far from giving an exact idea of the distribution of agricultural property. Since the number of farms is generally higher than that of owners and since, on the other hand, the area of the farms is lower than that of estates, the farm census cannot in the nature of things give a perfectly accurate picture of the real distribution of agricultural property.

Consequently, as a matter of fact, it is obvious that the concepts of property in land and of farm holding must always be conceived and considered as different categories of agrarian economy, all the more so because a high degree of concentration of landed property, as is, for instance, the case in England, may go hand in hand with a fairly normal distribution of farm holdings.

2. — Large and small farms in economic theory and agricultural practice.

From the problem of the difference between agricultural property and farm holding we now pass to that of the difference between farms of different size. In the first place it is necessary to define what we mean by a farm of normal size as well as to decide whether the large or the small farm is to be preferred as the basis of the agricultural structure of a country.

We know that this problem has a long history which brings us back to the time of Pliny, the author who condemned the *latifundia*. Since then, it has often been asked whether, in the interest of the State and of national economy, it is better for the land of a country to be divided into a few large estates or to be broken up into numerous small holdings.

It scarcely seems possible to establish any absolute standard by means of which farms could be divided into small and large ones. The area of the farm alone does not provide a satisfactory criterion for such a division.

Every farm should constitute an economic unit capable of providing the farmer with the minimum requirements for his livelihood. This does not, however, wholly depend on natural conditions, quality of soil, etc. since the economic and social conditions of the country also come into play. Prof. Laur, Delegate of Switzerland, when addressing the XV General Assembly of the International Institute of Agriculture, said: "In order to allow a peasant family to subsist on the Swiss Plateau, an area of between 2 $\frac{1}{2}$ and 3 hectares at least is required, free of debt and run by normal methods; if the farm is indebted up to 50 per cent., the minimum area necessary is between 3.5 and 4 hectares. Turning from these farms whose conditions are peculiar, to an American wheat farm, it will be found that the latter must have an area of 40 hectares or more if it is to provide a living for a peasant family. In China, on the other hand, a family of 8 to 10 persons can live on an area of 1 hectare, because the land is cultivated on the gardening method, and the family is content to live on a vegetarian diet." (1).

According to the statements made at the same General Assembly by M. Hribar, the Yugoslav Representative, a peasant belonging to his country and living on the shores of the Adriatic can subsist on half a hectare of land, and his standard of living is the same as that of peasants in northern countries who work from 4 to 5 hectares of land. The new Croatian law, promulgated at the beginning of 1940, estimates the minimum subsistence area required by a peasant at 1.75 hectares, with a minimum of 0.3 hectares for each member of his family.

It would be impossible, for instance, in estimating the size of Norwegian and Swedish farms, to apply the same methods as those adopted when considering the grouping according to size of German agricultural holdings as, owing to the climatic conditions of the Northern countries, the period during which the soil

(1) PROCEEDINGS OF THE XV GENERAL ASSEMBLY. International Institute of Agriculture, Rome, May 20-23, 1940, p. 66.

may be cultivated is too short. In Scandinavian countries arable areas are comparatively restricted, while the wooded areas which form part of the farms are very extensive. The further North a peasant lives, the greater the importance of the forest. The lower limits beyond which a farm is self-supporting are, of course, higher in the harsh climate of the North than in the Western regions of these countries or in the neighbouring countries to the West, such as Holland and Belgium, where, if necessary, a 2 hectare farm may be self-supporting. In the North the limit of economic self-sufficiency is between 4 and 5 hectares, or a little lower in Denmark, a little higher in Norway and Sweden, according to climatic conditions which are the decisive factor.

It is interesting to observe that in Denmark, the old method of assessing the importance of a rural property on the basis of its yield in "barrels" of grain, which was an old measure used for fixing the taxes due from small farms, takes account in the first place of the real value from the standpoint of return and not of extent. Consequently, certain properties with an area of several hundred hectares which are, however, situated in unproductive districts, are considered as being farms of little importance. The land value of farms represents a much more uniform standard of comparison than the distribution of farms according to the area of cultivated land, and this method was adopted in Denmark when making a general farm census in 1933.

In this connection Professor Skalweit aptly says (1): "Any opinion as to the preference to be given to one or another class of size of a farm, will depend on the point of view taken; *i. e.*, whether greater importance is attached to obtaining the highest possible return from the standpoint of private economy, or whether outstanding importance is given to the question of the greatest possible utility to the community, looking at the matter from the standpoint of national economy."

Generally speaking, the large farm may offer greater facilities for the adoption of rational methods and for obtaining a higher yield per unit of area, of cereals for instance, thus contributing towards a larger aggregate return. On the other hand, the small farm employs large numbers of country people and therefore offers a livelihood to a larger number of families, thus decreasing the flight from the land and has consequently better social effects. It should however be stressed anew that it is not the size alone of the farm which is decisive in establishing its importance, but also the quantity of human effort exerted rationally by the farm worker, the scientific and technical ability of the farmer, etc. For instance, the large farm in England, in Eastern Germany or in Northern Italy, with its highly specialized technique, intensive crops, etc., could not be compared with the Sicilian latifundia, where until recently cultivation was of the extensive type and where a radical transformation began only in 1940. Some students, including G. Gatti (2), even refuse to consider the Sicilian latifundia as large farms, in spite of their vast extent, because, according to Gatti: "A river is not large if its wide bed is dry." The economic superiority of large agricultural property is not an attribute inherent to its nature and is definitely conditioned.

(1) SKALWEIT: *Agrarpolitik*. Berlin, 1924, p. 13.

(2) GATTI, G.: *Le socialisme et l'agriculture*. Paris, 1902, p. 197.

There are probably no ideal types of farms, but only farms of an optimum size, which, given the economic and social organization concerned, yield the highest possible returns.

Economic theory has not yet found a solution to the problem of the most profitable distribution of farms. It should be recalled in passing that the Physiocrats, who, as is well known, considered the productivity of the soil as the chief source of wealth, were not agreed among themselves as to the size of farm to be preferred. In the interests of production, Quesnay and Turgot were in favour of the large farm, although the former considered that the existence of a numerous class of proprietors was a necessity for the military power of the State and contributed to the greatness of the people. In their opinion production costs should be considerably lower and the net yield much greater on the large farm than on the small. Mirabeau and Montesquieu preferred the small farm as a remedy for the flight from the land. Sismondi at first cast his vote in favour of the large farm. In his "Picture of Agriculture in Tuscany", 1801, he was still asking himself the question: "Is a numerous and poor population better than a small number of rich inhabitants?" But in his later works he favoured the small farm, not only because it yields more, but also because the large farm breeds a proletariat.

Generally speaking, classical political economy has given preference to the large farm.

Malthus declared himself a partisan of the medium-sized farm and an adversary of the small farm because, in his opinion, the division and wide distribution of property, which is so profitable when it does not go beyond a certain limit, is fatal to production when pushed to extremes.

In our own time, practical agricultural science is seeking to solve this problem on more inductive lines than was formerly the case. The decisive factors in the modern problem are not abstract and deductive reflections of a general order concerning the relative superiority of the large and the small farm, but the consideration of economic realities and the calculation of net returns obtained from farm accountancy.

To a certain extent this method has been for the economic theory of agriculture what Comte's positivism was for exact philosophic research. Henceforth the whole problem must in the first place rest on the observation of concrete facts and on an exhaustive study of the economic results obtained on the farm. In this respect, if he wishes to form a well-founded judgment, the theoretic economist must be guided by the practical economic aspect. But these are matters which will be dealt with in a later part of this work ⁽¹⁾.

3. — Changes in the agrarian structure of the countries of Western Europe.

The social aspirations which generally affected economic life in Europe during the XIX and at the early years of the XX century, had an influence on agricultural conditions also and led to a considerable improvement in the conditions

⁽¹⁾ It should be recalled that between 1931 and 1940 the Institute has published nine volumes concerning farm accountancy results in various countries. These data cover the period from 1927-28 to 1936-37.

of the rural population. The peasant who had formerly been regarded merely as an object of agriculture, acquired increasingly wide legal liberty and, from the economic and social standpoint, found that he had been granted a position more in harmony with his place in the total population and with the economic contribution made by agriculture to the nation. In this connection, very widespread changes have taken place in the evolution of the agrarian structure in Europe, especially in all that concerns the relations between man and the soil. The agrarian structure based upon the peasantry, which became always more pronounced, formed an outstanding feature of modern European agriculture.

This phase of the transformation of the land system has been rendered possible in Western European countries by various land settlement measures and by the general course of economic development. An attempt has been made to adapt the existing agrarian structure gradually to new social conditions without, however, altering it essentially. In the countries of Eastern Europe, which are younger economically and where traces of serfdom still lingered, the agrarian transformation has been more marked, especially owing the fact that after the War many social problems called urgently for a solution. It is true that almost nowhere has any attack been made on the basis itself of the agrarian structure and economic life of the country, *i. e.*, on the principle of private property. All agricultural landed property has been redistributed in virtue of special laws on agrarian reform, small ownership and small farming having become considerably more numerous at the expense of the large estates.

Of course, it is impossible to draw a definite line of demarcation between land settlement and agrarian reform. Thus, Ireland may be reckoned among the countries where the transformation took the form of land settlement, and this is true for other reasons besides those of a geographical order. The transformation of the land system, as a social factor, in that country has, however, definitely assumed the character of an agrarian reform. On the other hand, Finland and Bulgaria, for instance, may be numbered among those countries which have carried out agrarian reforms in the strictest sense of the term, although they may perhaps with equal reason be included in the group of countries of land settlement.

Owing to the whole economic structure of the countries concerned, the methods adopted in effecting the transformation, as well as the general ideas on which it was based, were of a different order, the reasons leading to the creation of small farms and to peasant settlement were also quite different.

In the Western European countries where industrialization has made most progress, the percentage of the agricultural population has fallen sharply in the course of their economic development. In Great Britain, for instance, it dropped to 6 per cent. (1931), in Belgium to 17 per cent. (1934), in the Netherlands to 20.6 per cent. (1930), in Switzerland to 21.3 per cent. (1930), in Germany to 28.8 per cent. (1933), in Norway to 28.9 per cent. (1930), in Sweden to 30.6 per cent. (1930), in France to 35.0 per cent. (1931), in Denmark to 35.9 per cent. (1930), etc. In these countries one of the most important tasks of agrarian policy lies in stimulating the urban proletariat—the peasants of yesterday—to return to the land and to effect a more uniform distribution of the population between town and country.

In the agricultural countries of Eastern Europe, on the other hand, where the progress of industrialization was not so marked, and where the percentage of agricultural population is greater than in the Western countries, the figures are as follows: Hungary, 53 per cent. (1930), Latvia, 66.2 per cent. (1930), Estonia, 67 per cent. (1934), Poland, 75.9 per cent. (1921), Lithuania, 77.7 per cent. (1923), Yugoslavia, 78.7 per cent. (1931), Romania, 78.2 per cent. (1930), Bulgaria, 81.0 per cent. (1926), etc. Agrarian reform in these countries had therefore to be directed not only towards strengthening the position of the peasant classes, but also towards helping the landless rural population to improve their social status.

In the first case, by creating new farms, an attempt is made to normalize and encourage a better distribution of the population throughout the country, as the lack of balance in this field is mainly due to the predominance of town dwellers, whose numbers are steadily increased by the exodus of peasants from the rural districts.

In the countries belonging to the second group where industry is still attracting only a few peasants and where the relationship between man and the soil has been upset by the fact that there is not enough land available, these two factors must be brought back to an optimum relationship in the country districts by effecting a better distribution of the land among the rural inhabitants. The solution of the problem has to be sought in agrarian rather than in population policy. This distinction, although it is not always very obvious, gives the agrarian problem a different aspect in the Western European countries as compared with those in the Eastern part of the continent.

Although these causes for agrarian transformation may vary slightly in this respect, there is only one method for remedying the evil in both cases: by increasing the number of small farms and by encouraging the masses to share in the nation's agricultural property.

Here we shall dwell in the first instance upon the most important agrarian measures adopted in this connection by Western European countries. It goes without saying that the results obtained cannot be permanent. Economic balance between land and man lasts no longer than the effects of the factors which have led to this *statu quo*. The uninterrupted increase in population, the exploitation of new land whose extent is nevertheless limited, lead to a constant variation in the amount of land available to the rural population. This is why measures of agrarian reform, as well as those of land settlement, if they are to be effective, must always be so conceived as to adapt themselves to the transformations which will eventually take place in agricultural life. ⁽¹⁾

England and Wales. — In England, a country industrialized to the highest degree, agriculture plays a comparatively secondary part. Ever since the close of the XVIII century, industrial interests have increasingly dominated the whole

⁽¹⁾ The principal measures concerning rural property, land settlement, formation and conservation of rural small holdings, etc. are collected in the *ANNUAIRE INTERNATIONAL DE LÉGISLATION AGRICOLE*, published by the International Institute of Agriculture.

economic life of the nation. The invention of the steam engine by Watt and of the mechanical loom by Cartwright provided the starting point, more than in any other country in a tremendous technical revolution, similar to that which occurred in France about the same time, if such a comparison is admissible, when the proclamation of the Rights of Man introduced the political and social revolution. England became the centre of world trade and in exchange for her industrial exports received agricultural raw materials and foodstuffs from her colonies, which are her agricultural *Hinterland*, and from other countries.

The volume of her exports during the past few years represented about 10 per cent of world exports. She ranked immediately after the United States whose exports amounted in 1938 to 13.46 per cent. of world exports (¹). British exports have, however, a more industrial character than those of the United States. The economic power of England lies in the extreme differentiation of labour which has enabled her to bring industrial production to the highest degree of perfection. On the other hand, the consequence of this very differentiation is that when international trade declines and when the flow of merchandise from markets meets with obstacles, the country's supplies of agricultural products may be adversely affected.

In agriculture the laws of succession and the practice of entail among the landowning class contributed to the practical extinction of the peasantry, because they immobilize large estates and restrict transactions in land. It seems, however, that the high rate of death duties to which succession is subject often compels the landowners, through lack of capital, to sell part of their property and in this way to throw "frozen" land on the market.

This agricultural situation has been closely studied ever since 1875, when a census was taken of agricultural property and the Agricultural Holdings Act was promulgated in order to increase the number of small farms.

The Small Holdings and Allotments Act passed in 1908, had much wider scope and was directed towards providing employment for agricultural labourers. Under this law County Councils were entrusted with the provision of small holdings under the control of the Board of Agriculture.

The small holding is defined in this act as an agricultural undertaking over one acre (0.4 hectare) but less than 50 acres in area, if, at the time of sale or lease, its annual value for income tax purposes did not exceed £ 50. Allotments were limited to a maximum area of five acres, except in certain special cases. A particularly important provision of the Act was that empowering County Councils to expropriate land when they could not obtain it by voluntary agreement. The law did not transfer property rights on the holding or allotment to the new settlers, but only granted it to them on lease.

Some 31,000 new farms were thus created between 1908 and 1932, or about 8 per cent. of the total number of farms (395,823) of 1 acre or over existing in England and Wales in 1930. The purpose of this law was not so much to create peasant farms as to provide small holdings for agricultural labourers.

(¹) *Review of World Trade* 1938. League of Nations, Geneva, 1939, p. 21.

As regards the provision of land for soldiers and sailors discharged after the Great War (1914-1918), under the Sailors and Soldiers (Gift for Land Settlement) Act, 1916, and the Small Holdings Colonies Acts of 1916 and 1918, 16,740 ex-service men were granted 101,600 acres in various countries. From 1919 to 1924 the cost of buildings erected by the settlers proved exceedingly heavy, and the interests on the loans contracted was sometimes as high as 6 ½ per cent. It is true that the Government guaranteed the counties against loss and indemnified them to the extent of one half of their total outlay amounting to £ 10,000,000. The rents paid by the ex-soldiers and sailors were not based on real costs but were graduated according to the settlers' paying capacity.

A new Land Settlement Association was created in 1934, its purpose being to provide cottage homesteads for the unemployed. The settlers are employed by the Association for the first five years.

The measures adopted under the new settlement policy were unable, however, to do more than obviate to a limited degree the consequences of the dissolution of the class of peasant smallholders, which had been going on during past centuries, nor could it do much to mitigate the effects of the rapid urbanization of the country.

The present agrarian structure is still based mostly upon the large estate. The social environment is not such as to encourage the development of peasant farming.

Over a period of almost seventy years, from 1870 to 1938, the total number of farms declined from about 449,547 to 365,972, a loss of 84,575. Since 1914, when there were 435,124 farms (see Table II), the farms which disappeared belonged mostly to the two extremes, *i. e.*, on the one hand, the "Small Allotment Holdings"—with an area under 2 hectares which only offer subsidiary employment to workers and whose importance is social rather than economic, and the "Very Small Holdings"—between 2 and 8 hectares in area, and on the other hand the large farms with an area varying between 61 and 121 hectares, as well as those whose area was over 121 hectares. The medium-sized farms with an area between 8 and 20 hectares which are also classed as Small Holdings have only increased slightly in number in spite of the Government's policy which has attempted since 1908 to stimulate the creation of this

TABLE II. — *Number of Agricultural Holdings of various Size in England and Wales in different Years from 1914 to 1938.*

| Years | Under 2.02 hectares | Above 2.02 and not exceeding 8.09 hectares | Above 8.09 and not exceeding 20.23 hectares | Above 20.23 and not exceeding 40.47 hectares | Above 40.47 and not exceeding 60.70 hectares | Above 60.70 and not exceeding 121.40 hectares | Above 121.40 hectares | Grand total |
|---------------------|---------------------------|---|--|---|---|--|-----------------------------|----------------|
| 1914 | 91,570 | 121,698 | 78,454 | 59,514 | 31,860 | 37,615 | 14,413 | 435,124 |
| 1920 | 80,737 | 114,517 | 79,542 | 60,697 | 32,298 | 36,708 | 13,492 | 417,991 |
| 1930 | 72,984 | 103,975 | 77,970 | 61,703 | 31,998 | 34,957 | 12,230 | 395,823 |
| 4 June 1938 | 62,424 | 90,990 | 72,946 | 61,685 | 31,793 | 34,307 | 11,827 | 365,972 |

type of farm. Farms varying in size from 20 to 40 hectares, on the contrary, show a slight increase in spite of the general decline.

Small holdings varying in size between 0.4 and 20 hectares, which predominate in industrial districts, numerically constituted 64.4 per cent. of the total number of farms, but only represented 16 per cent. of the area occupied, while the large farms with an area between 61 and 121 hectares, situated for the most part in the mountainous regions, formed 11.9 per cent of the total number of farms but represented 50.9 per cent. of the total farm area.

During the past few years, however, many measures were taken with the object of encouraging agriculture. The following statement was made in "The World Agricultural Situation in 1938-39" (1):

"The most noteworthy general features of the agricultural returns made in June 1939 are increases in the total arable land and in the number of agricultural workers in England and Wales. These changes are noteworthy because they are not in accordance with the persistent trend which began in 1870, when the great decline in arable farming in the United Kingdom and in the number of agricultural workers began."

Generally speaking it may be said that changes in the English land system may perhaps be necessary in order to bring it into line with new conditions and requirements. In a country where the area available for agricultural uses is very restricted and tends to shrink, it is extremely important, even if agriculture has attained a high degree of intensification and gives a very high yield per unit of area, that the whole of the land should be fully utilized for production.

Scotland. — Owing to natural conditions and its proximity to England, Scotland may be said to be marked out for stock farming and in particular for sheep breeding, as she supplies the English textile industry with very large quantities of wool.

The situation of tenant farmers in Scotland, who, in 1913, represented about 90 per cent. of the total number of farmers, could not, however, be described as good. The principal difficulties with which the tenant farmer had to contend were the absence of a legally recognised right to compensation for improvements made by him on the farm, the risk that his rent might be arbitrarily raised as a result of the improvements which he himself had made, and the possibility of an arbitrary cancellation of the content.

It is true that during the past fifty years living conditions among the masses in Scotland, in spite of the fact that population has been increasing rapidly on relatively poor soil, have greatly improved. Almost simultaneously with the English Allotments Act, the first law in favour of the Highland crofters (Crofter Holdings [Scotland] Act) was promulgated in 1886; this law has been called the charter of the Scottish agrarian constitution. It fixed the scale of rents which was to be revised every seven years and guaranteed fair compensation to crofters who made improvements on the farms rented by them. Under the law a

(1) THE WORLD AGRICULTURAL SITUATION IN 1938-39. International Institute of Agriculture, Rome, 1940, p. 353.

Commission was appointed in the interest of the crofters to study the possibility of increasing the size of the farms.

In 1897 the Congested Districts Board was appointed and empowered to purchase land and distribute it, under certain conditions, to crofters in the Highlands. This procedure was later extended to the rest of Scotland, while the Board itself was absorbed by the Department of Agriculture.

The Small Landholders Act was published in 1911, with the principal object of creating new farms or enlarging those already in existence. During the Great War, from 1916 to 1918, another law was published called the Small Holdings Colonies Act, which was followed in 1919 by the Land Settlement Act.

The following results have been obtained in Scotland up to the present in connection with the transformation of the agrarian structure of the country. From 1886 to 1938, 6,365 new farms were formed and 5,212 enlarged in order that they might be of a size suitable for economic operation. The total area of these farms amounted to 861,066 acres, or 4 $\frac{1}{2}$ per cent. of the total area of the country. Consequently, during the past fifty years, the State has created or enlarged 11,557 Scottish farms; 72 per cent. of all the farms are situated in mountainous regions and are operated by farmers or fishermen, while 28 per cent. are operated by persons who do not belong to the farming classes. The corresponding figures in the lowlands are 52 per cent. and 48 per cent.⁽¹⁾

The State has aided new farmers by granting them credits which now amount annually to £ 175,000.

In the Highlands, where the settlement policy has been most widely applied over an area of 803,989 acres and where cattle-breeding and sheep-rearing predominate, the average area of newly constituted farms is 50 acres.

The farms in the Lowlands, on the other hand, are mostly between 5 and 10 acres in area and intensive systems of farming, such as poultry farming, horticulture and market gardening being practised on these holdings, while farms devoted to cereal crops, stockraising and dairying run up to 50 acres.

In 1931, at the time of the agricultural census, the distribution of farms was as follows (Table IV).

From the above table it will be seen in the first place that rough grazing-land occupies a very large proportion of the total agricultural area, amounting to 3.3 million hectares out of a total of 5.2 million hectares, or almost two-thirds. Arable land, meadows and grass represent little more than one-third. Consequently, the average size of the farms varies, according to whether comparison is made with the total agricultural area or only with the area of arable land, meadows and pastures. In the former case, the average area is 68.1 hectares, in the latter, 24.7 hectares, or barely one-third.

The relation between the number of farms and the area farmed presents itself in a more favourable light, especially in the smaller farms, if the total agricultural surface, including grazing land, is taken into consideration, then when only the agricultural area in the strict sense of the term is considered. In this

⁽¹⁾ TWENTY-SEVENTH REPORT OF THE DEPARTMENT OF AGRICULTURE FOR SCOTLAND. Edinburgh, 1939, p. 38 et seq.

TABLE III. — *Number and Area of Holdings according to Size of Area under Crops and Grass, exclusive of Rough Grazings.*

| Classification of holdings according to size | Number of holdings | | Area under crops and grass | | Area of rough grazings | | Total area | |
|--|-----------------------|-----------------|-------------------------------|-----------------|---------------------------|-----------------|------------|-----------------|
| | Absolute data | Percent- age | Hectares | Percent- age | Hectares | Percent- age | Hectares | Percent- age |
| 0.4 to 2 hectares | 16,778 | 22.1 | 22,338 | 1.2 | 154,839 | 4.7 | 177,177 | 3.4 |
| 2 " 6 " | 18,530 | 24.4 | 68,805 | 3.7 | 461,173 | 14.0 | 529,978 | 10.3 |
| 6 " 12 " | 8,771 | 11.6 | 78,407 | 4.2 | 448,300 | 13.6 | 526,707 | 10.2 |
| 12 " 20.2 " | 6,416 | 8.5 | 104,526 | 5.6 | 481,535 | 14.6 | 586,061 | 11.3 |
| 20.2 " 30.3 " | 5,727 | 7.6 | 145,433 | 7.8 | 370,915 | 11.3 | 516,348 | 10.0 |
| 30.3 " 40.5 " | 4,517 | 6.0 | 161,148 | 8.6 | 298,186 | 9.1 | 459,334 | 8.9 |
| 40.5 " 60.7 " | 5,923 | 7.8 | 298,585 | 15.9 | 406,484 | 12.3 | 705,069 | 13.6 |
| 60.7 " 121.4 " | 6,799 | 9.0 | 570,131 | 30.3 | 468,037 | 14.2 | 1,038,168 | 20.1 |
| 121.4 hectares and above | 2,389 | 3.0 | 425,186 | 22.7 | 204,995 | 6.2 | 630,181 | 12.2 |
| Total . . . | 75,850 | 100.0 | 1,874,559 | 100.0 | 3,294,464 | 100.0 | 5,169,023 | 100.0 |

way the first three size groups running from 0.4 to 20.23 hectares comprise 58.1 per cent. of the farms, extending over 9.1 per cent. of purely agricultural land; this figure rises to 23.9 per cent. if the total area of the farms is taken into account. This is the natural consequence of the fact that on the smallest farms the agricultural area is generally smaller than that of rough grazing.

In the larger size groups, running from 60.7 to 121.4 hectares, the contrary is the case, because large farms have more agricultural and less grazing land. The ratio between the number of farms, the agricultural area and the total area is as follows: the two largest size groups comprise 12 per cent. of all the farms and more than half of the agricultural land (53 per cent.), and only 30.3 per cent. of the total area of the farms.

Large farms with a greater extent of grazing land are found as a rule in the Highlands, while medium-sized and small farms with a larger area of purely agricultural land are situated in Central and Southern Scotland.

Land settlement has made it possible to free a large part of the congested areas, especially those situated in the plains, from the pressure of their excess population. This problem is of very little importance in the Highlands, which account for only about 7 per cent. of Scotland's total population.

Ireland. — Recent changes in agricultural conditions in Ireland date from about 1860. Owing to the relatively rapid increase in the population and to the peculiarity of the agrarian system in force, there was a great scarcity of land among the rural population. The failure of the potato crop in 1846 was followed by a terrible famine which caused many deaths among the population and forced large numbers of the peasants to emigrate. From a population of 8 million in 1841 the number of inhabitants fell by 1851 to 6 $\frac{1}{2}$ million.

In 1876 almost one half of the land in Ireland, over 20,000 million acres, was still in the hands of some 700 persons, most of whom did not live on their estates.

State intervention in matters concerning agricultural property began in 1870, with the Irish Land Bill which was passed by Parliament under Gladstone and opened up a new era in social history of Ireland. The reform consisted in the recognition of the right of a tenant evicted by his landlord to compensation for the improvements made by him on the land.

Another provision, which was of more importance to the tenant, *i. e.*, the guarantee that he could continue to operate his farm without running the risk of being turned out at any moment (tenancy at will), was enacted only in 1881. This law accorded the three basic demands of the tenants, known as "the three f's":

(1) *fixity of tenure* as long as they paid their rent regularly;
 (2) *fair rent*, fixed by an independent authority empowered to do so; and
 lastly,

(3) *free sale of tenants improvements* in those cases where they might be compelled by special circumstances to abandon their farms.

As a result the Irish rent roll was reduced by a total of £ 1,500,000 per annum and the term of lease was fixed at 15 years.

The enforcement of these measures was entrusted to the Irish Land Commission appointed in 1881 and considered ever since as the chief authority empowered to adjudicate in all matters concerning landed property.

The improvement in the juridical and economic status of the tenant farmer went hand in hand with another even more radical reform of social conditions in the country, *i. e.* the transformation of the tenant class into a class of peasant owners.

If the movement in favour of the creation of the class of peasant owners is to be understood, one must go back as far as 1870. A series of land laws promulgated in 1885, 1891, 1896, 1903, 1909, 1915 and 1923, made it possible for tenants to purchase their farms by means of Government advances amounting to two-thirds of the purchase price of the farm. Tenants refund the loans granted for the purchase of the land in annuities over a period of 68 and a half years; they also have the option of clearing the debt at one payment.

The total amount appropriate for the purchase of land and for which grants were made up to and including March 31, 1938, under the Land Purchase Acts amounted to £ 127,918,293; this sum affects a total area of 15,046,465 acres (rented and not rented), benefiting 435,395 farms in all. ⁽¹⁾

As regards the decongestion of the congested districts – congestion being determined generally not so much by the excessive density of population as by the low yield of the land which is far from fertile – the law promulgated in 1923 provided that with certain exceptions all unrented land situated in the counties with congested districts and all unrented land situated in other regions of the Irish Free State which might be required for the purpose, must be placed at the

(1) STATISTICAL ABSTRACT. Compiled by Department of Industry and Commerce. Dublin, 1939, p. 76.

disposal of the Land Commission. Over and above the right to exercise compulsion, the Commission is also empowered to acquire by voluntary purchase or exchange unrented land situated outside the congested districts. All the money which the Commission may require for improvement necessitated by the distribution of this land among the new owners or among the owners of existing farms which do not however form self-contained economic units (road repairs, enclosures, ditches, buildings, supplies of peat, etc.) is provided by the State from public funds. Purchasers reimburse in yearly instalments a certain part of the costs of improvements, this part being established by the Commission. In order to determine whether applicants for allotments of unfarmed land possess the necessary qualifications, the Land Commission must be given proof of their farming ability and their intention to work and not to sell, rent or transfer the land.

As a result of this agrarian reform, a class of peasant proprietors has now grown up in Ireland. About 400,000 peasant farms have now been created out of land which formerly belonged to 4,000 landowners. 97.5 per cent. of the total farm area is now in the hands of owner farmers. Some 1,500,000 people, or about one half of the inhabitants of the whole Irish Free State, have benefited from the agrarian reform.

There remain about 300,000 landless people, while the available reserves of land do not amount to more than 404,000 hectares. But this land problem is not of a nature to be solved exclusively by means of merely agrarian policy, as its solution depends upon the general social and economic progress of the country.

The following statement is contained in a report sent to the International Institute of Agriculture by the Department of Agriculture of the Irish Free State:

" The completion of land purchase in Ireland will create practically a nation of peasant proprietors in full ownership of their lands. This should make for social and economic prosperity and political stability. The prohibition of the subdivision and subletting of holdings without consent of the Land Commission will, it is hoped, prevent a recurrence of the splitting up of farms into uneconomic units, which has been a fruitful cause of " Congestion " in the past. At the best land legislation can only partially solve the problem of congestion, as there is not sufficient untenanted land available to relieve it in its entirety, but the development of local industries should materially assist in its solution. "

The following table shows the structure of the Irish farms according to the last census of farms taken in 1929.

In 1929 the total number of Irish farms was 402,744 with a total area of 6,214,302 hectares. Leaving aside all the tiny farms under 2 hectares, which rarely represent economic propositions, the small farms between 2 and 12 hectares represent 42 per cent. of the total number of farms and 19 per cent. of the total area. Farms belonging to the largest size group, with an area of 81 hectares and over, do not exceed 2.1 per cent of the number of farms and 21.2 per cent. of the total farm area. The differentiation between these two extremes, the largest and smallest size groups, is remarkable enough, but all the evolution in the agrarian structure tends rather towards the medium-sized farm and to the somewhat larger farm of between 12 and 81 hectares. These farms represent 33.7 per cent. of the number of farms and 58.9 per cent. of the total farm area.

TABLE IV. — *Number and Area of Holdings and their Distribution according to Size.*

| Classification of holdings according to size | Number of holdings | | Area of agricultural lands | | Total farm area | |
|--|-----------------------|-----------------|-------------------------------|-----------------|--------------------|-----------------|
| | Absolute date | Percent- age | Hectares | Percent- age | Hectares | Percent- age |
| Not exceeding 0.40 hectares | 54,904 | 13.6 | 14,763 | 0.3 | 15,064 | 0.2 |
| Above 0.40 and not exceeding 1.01 hectares | 15,481 | 3.8 | 10,534 | 0.2 | 11,017 | 0.2 |
| " 1.01 " " 2.02 " | 19,330 | 4.8 | 29,914 | 0.6 | 32,142 | 0.5 |
| " 2.02 " " 4.05 " | 37,489 | 9.3 | 116,519 | 2.4 | 125,383 | 2.0 |
| " 4.05 " " 6.07 " | 39,893 | 9.9 | 191,985 | 3.9 | 213,391 | 3.4 |
| " 6.07 " " 12.14 " | 91,807 | 22.8 | 727,526 | 14.9 | 846,434 | 13.6 |
| " 12.14 " " 20.23 " | 63,465 | 15.8 | 889,725 | 18.2 | 1,017,331 | 16.4 |
| " 20.23 " " 40.47 " | 50,909 | 12.6 | 1,221,512 | 25.1 | 1,450,625 | 23.3 |
| " 40.47 " " 80.94 " | 21,179 | 5.3 | 931,482 | 19.1 | 1,185,952 | 19.2 |
| " 80.94 hectares | 8,287 | 2.1 | 744,689 | 15.3 | 1,316,963 | 21.2 |
| Grand total . . . | 402,744 | 100.0 | 4,878,649 | 100.0 | 6,214,302 | 100.0 |

It will therefore be seen that the problem of Irish agrarian structure has changed entirely in aspect during recent years; those who direct the agrarian policy of the country are chiefly concerned at present, not so much with the insecurity of old tenant farmers, but rather with the need for the promotion of a rational distribution of agricultural land among the rural population and with the other problems arising in this connection.

(To be continued)

M. TCHERKINSKY

INTERNATIONAL CHRONICLE OF AGRICULTURE

MEXICO

The economic and commercial situation on the eve of the war and after the outbreak of hostilities.

When the war broke out in September, 1939, Mexico was just emerging from a period when trade conditions had been extremely difficult. Here, as everywhere else, 1937 had been a satisfactory year, while, owing to the recession in the autumn of 1937, the situation in 1938 was bad; for reasons applying to Mexico in particular, however the economic depression assumed very serious proportions. From the outset of 1938, Mexican economy was suffering from uneasiness due to apprehension as to the issue of the long struggle between the foreign oil companies, the trade-unions and the Government; before the year was far advanced the problem was solved by the expropriation of the property of these companies on March 18, 1938. The United States,

Great Britain and the Netherlands immediately boycotted Mexican oil exports, and although in the course of the year Mexico succeeded in adjusting the situation to a certain extent by directing her exports to other countries, the loss of large markets for one of her chief exports, added to the fact that the situation was already unsatisfactory, made the depression worse. Mexican foreign trade declined by 11.5 per cent during 1938, but, since the peso depreciated considerably in the course of the year, the decline in trade was in reality much more severe than was apparently the case: calculated in American currency, the loss amounted to 29.2 per cent. Imports from the United States diminished much more than those from other countries, dropping to a level which had not been touched since 1914, while those from Germany, Italy and Japan increased as a result of the barter agreements concluded between Mexico and these countries. Thanks to the general recovery of world trade however, the Mexican situation improved during the last months of 1938 and the first half of 1939, although there were some passing relapses. In July and August the threat of war in Europe raised the price of silver and other metals exported by Mexico, with the result that the peso became firmer and the situation improved still further. Since the mere threat of hostilities had had a favourable influence on her trade, when war really broke out, Mexico, like the majority of other countries exporting raw materials, concluded that neutrals would have abundant opportunity for doing business. It was not long before matters appeared in another light; during the first month of the war, exports fell from 86.7 million pesos in August, 1939, to about 56.0 millions and, during the same period, imports fell from 63.8 million to 43.0. It became obvious that the temporary rise in the peso and in the prices of raw materials was of little real importance, since the shortage of tonnage and the rise in freights closed many markets to Mexican exports and hampered shipments from European suppliers. For a few months the latter carried out their contracts, although with considerable delays. German goods still arrived in fairly large quantities until December, 1939, although British and French shipments had already ceased by that time. Trade relations continued with Italy until her entry into the war. As the difficulty of doing business with the European countries gradually increased, however, Mexican trade was increasingly diverted towards the United States, and it was that country and not Japan or even home industry,—which is being energetically developed in certain sectors—that inherited European trade, especially as regards certain products formerly imported largely from Germany, such as agricultural machinery, mining and irrigation machinery and equipment, and pharmaceutical products, the last mentioned also imported from Italy. As the war continues and the hope of reviving trade relations with European countries in the near future becomes fainter, Mexico is purchasing more and more from the United States.

As regards the country's supplies of foodstuffs and raw materials, there appeared to be no cause for anxiety or for Government intervention at the beginning of the war. Stocks were adequate and the 1939 crops have, generally speaking, been satisfactory; apparently the same may be said of the 1940 harvest. The Government did not need to create special organizations for the control of the market and prices, as has been found necessary elsewhere, since such bodies already existed in the Committee to regulate the Marketing of Prime Necessities and the National Committee for Foreign Trade, both appointed in 1938, and in the services of the Secretariat of Agriculture. The activity of these bodies was supplemented in January 1940 by the appointment of local committees to control trade in prime necessities ⁽¹⁾. Government activity in this

(1) *Diario Oficial*, Vol. CXVIII, No. 12 (January 15, 1940).

field was therefore restricted to the promulgation of several orders ⁽¹⁾ which in order to cover the needs in foodstuffs and raw materials for industry, and to safeguard public health, prohibited the export of live cattle, dried kidney beans, maize, rice and other agricultural products as well as of wool and raw materials indispensable to Mexican industry and of pharmaceutical products. In addition to the above measures the Government also intervened in each individual case by subsidizing or in other ways facilitating the importation of articles which might be found necessary (e. g. Egyptian cotton for the textile industry, maize, etc.).

Structure of foreign trade.

Mexico is generally considered as a country which exports raw materials and chiefly imports manufactured goods. This is only partly the case. It is true that Mexican exports consist for the most part of mineral, vegetal and animal products, and only a very small quantity of manufactured goods. On the other hand, her imports include very few articles of direct consumption and consist mainly of raw materials for transformation within the country, while the manufactured goods imported mostly consist of equipment necessary for this transformation.

Value of Mexican exports from 1936 to 1939 (9 months) ⁽¹⁾

(in million pesos) ⁽²⁾

| Products | 1936 | 1937 | 1938 | 1938 9 months | 1939 9 months |
|---|-------|-------|-------|------------------|------------------|
| Mineral products ⁽³⁾ | 578.9 | 708.7 | 661.8 | 522.4 | 554.3 |
| Agricultural products: | | | | | |
| vegetal ⁽⁴⁾ | 172.6 | 148.1 | 123.3 | 97.8 | 106.4 |
| animal ⁽⁵⁾ | 16.0 | 21.6 | 23.1 | 17.1 | 35.2 |
| <i>Total</i> | 188.6 | 169.7 | 146.4 | 114.9 | 141.6 |
| Manufactured products | 7.5 | 10.1 | 9.1 | 7.1 | 6.3 |
| Other products | 0.3 | 3.9 | 20.8 | 19.1 | 7.9 |
| <i>Grand Total</i> | 775.3 | 892.4 | 838.1 | 663.5 | 710.1 |

⁽¹⁾ *Revista de Estadística, México*. Vol. I, No. 9, November, 1938; Vol. II, No. 1, January, 1939; Vol. II, No. 11, November, 1939; Vol. III, No. 2, February, 1940.

⁽²⁾ The official rate of the peso fixed by the *Banco de México* averaged 3.60 pesos to the dollar in 1936 and 1937, 4.52 in 1938 and 5.18 in 1939. The average for January, 1940, was 5.98.

⁽³⁾ Oil and derivatives, gold and silver, copper, lead, zinc, mercury, cadmium, antimony and molybdenite.

⁽⁴⁾ Henequen, cotton, chicle gum, vanilla, rice, dried kidney beans, chick peas, fresh vegetables and fruits (especially bananas).

⁽⁵⁾ Live cattle, skins and hides, fish and shellfish, honey.

⁽¹⁾ *Diario Oficial*, Vol. CXVI, No. 32 (October 9, 1939); Vol. CXVII, No. 4 (November 1939); Vol. CXVII, No. 37 (December 1939) and Vol. CXVIII, No. 10 (January 12, 1940).

Of the countries importing goods from Mexico, the United States received 41.6 per cent. in 1937, Great Britain 15 per cent. and Germany 11 per cent. The Dutch West Indies received 10 per cent., Belgium 4 per cent. and the share of the Netherlands, Cuba, France, Denmark, Sweden and Brazil amounted in each case to 1 per cent., while the other countries' imports from Mexico amounted to less than 1 per cent. Consequently, the greater part of Mexican exports is absorbed by the United States, Great Britain and Germany, followed closely by the Dutch West Indies. The *United States'* imports from Mexico consist for the most part of metals such as gold, silver and copper, followed by oil, tomatoes, coffee, henequen and live cattle. In exchange they export to Mexico every type of machinery, lubricant oils and fats, timber, oil and natural gas for fuel, iron in different forms and chemical products. *Great Britain* purchases the following products from Mexico: cotton, rice, colophane, henequen, candleilla wax, antimony and lead. Her exports to Mexico consist of every description of industrial products. *Germany's* imports from Mexico include asphalt, lead, zinc, rice, coffee, and timber, while her exports to that country consist for the most part of large quantities of industrial products including pharmaceutical specialities, dyes and paints, fertilizers and other chemical products. The *Dutch West Indies* purchase little from Mexico beyond oil.

Policy adopted as regards agricultural production.

NATURAL BASIS OF AGRICULTURAL PRODUCTION.

Mexico has always been an essentially agricultural country. When the Spaniards arrived they found that though agriculture presented a rudimentary form, as far as the methods and implements were concerned, its production was comparatively varied. Besides maize and kidney beans which constituted, then as now, the staple food of the population, the inhabitants also cultivated sweet potatoes, tomatoes, cacao, green peppers and textile fibres such as cotton and agave fibre. The Spaniards, in their turn, introduced into Mexico, as well as into all the other countries they conquered, a large number of plants grown in Spain and the Canaries, such as European cereals and fruits, chickpeas, sugar cane and bananas, which easily became acclimatized. They also introduced the potato. Another innovation which had an incalculable influence on Mexican economy was the introduction of livestock which was unknown until the coming of the Spaniards; it consequently became possible for the Mexicans to utilize the vast tracts of grazing land which abound in their country (¹).

A study of the table of Mexican export values (page 345), is apt to give a wrong idea of the part played by agriculture in the country's economy. It is true that mineral products predominate among the list of export items, although during the past twenty years exports of vegetal products and especially of fresh vegetables and tropical products have increased considerably. The importance of Mexican agriculture is felt especially, however, on the home market and in the life of the country. It is estimated that the rural inhabitants represent on an average 66.53 per cent. of the entire population of

(¹) SAPPER, Prof. Karl, Mexico, Land, Volk und Wirtschaft. Zweite, vollständig neubearbeitete Auflage der „Wirtschaftsgeographie von Mexico“. Wien, 1928.

the country ⁽¹⁾, while in some States the percentage rises to over 80 per cent. More than 70 per cent. of the active population is engaged in cultivating the land, stock-breeding, hunting and fishing ⁽²⁾. Again, more than one quarter of the national wealth was invested in agriculture in 1930. As regards the value of agricultural production, it was estimated in 1929 that the annual crops, utilization of the forests and stock-breeding produced 781 millions pesos, while transformation industries produced only 586 millions and the mining and oil industries only 422 millions pesos ⁽³⁾. In spite of occasional imports of foodstuffs and even, in years when the crops have been unsatisfactory, of products which are grown as extensively and which have such a vital importance as maize and dried kidney beans, Mexico feeds her population on homegrown agricultural products.

Despite this undeniable importance of Mexican agriculture from the economic standpoint, opinions circulated concerning the wealth or poverty of the country as regards agriculture nevertheless differ widely. As a rule Mexico is considered as a country whose agricultural output is far below her possibilities, but it is believed that this output could easily be increased by taking advantage of the combination of her geographical position and the mountainous character of the country. Indeed, Mexico lies between 14 $\frac{1}{2}$ and 32 $\frac{1}{4}$ latitude North, while the altitudes vary between sea level and 3000 metres on the high plateaux crowned with peaks such as Mount Orizaba (5,580 m. above sea level), and it is consequently possible to grow crops suitable to all climates, from the low-lying tropical regions along the Gulf of Mexico and Pacific coasts, through the whole scale of climates belonging to the sub-tropical and temperate zones to those of the cold regions. Mexico can therefore grow the following plants: bananas, mangoes, coffee, cacao, vanilla and coconuts, just as well as any tropical country, and produce at the same time in her temperate and cold areas wheat, barley, alfalfa, apples, pears, peaches, grapes and nuts.

These advantages are counterbalanced however by equally important disadvantages. Although the tropical and low-lying regions are extremely fertile, their utilization is hampered by an unhealthy climate with excessive moisture in some places, by the danger of floods and by a too luxuriant wild vegetation which requires constant clearing to prevent it from suffocating the crops. Conditions in the temperate and cold regions are just the opposite: the climate is healthy, but the lack of moisture and the structure of the country all too often make field work difficult, of uncertain result and even entirely impossible. Most of the country consists of an extensive mountainous region composed of two chains, the Sierra Madre Oriental and the Sierra Madre Occidental, which rise gradually in a series of terraced escarpments from 20° latitude N., dividing towards the North and encircling a wide plateau, with plains situated at an altitude of 2,680 metres, like the Toluca plain, or at 2,280 metres, like the Mexican plain. The mountain slopes fall down steeply to the sea. To the North of the plateau the Sierra Madre Occidental is cleft by deep ravines and gorges which separate the low-lying regions of the country from the plateau itself and from the valleys lying in

⁽¹⁾ The 1930 census figure put the population at 16,552,722 inhabitants. According to an estimate made on June 30, 1938, this figure rose to 19,478,791, but the above percentages have probably not decreased. Mexican statistics are still based for the most part on the 1930 census. Other censuses were taken on October 20, 1939 for landed property and on March 6, for the population, agriculture as a whole, Communal holdings (*ejidos*) and other subjects.

⁽²⁾ ANUARIO ESTADÍSTICO DE LOS ESTADOS UNIDOS MEXICANOS, 1938. D. A. P. P., México, 1939.

⁽³⁾ PEÑA, M. T. de la. El Problema Agrícola Nacional. Secretaría de Agricultura y Fomento, 1936, quoted in MÉXICO EXPORTADOR, Banco Comercial de Comercio Exterior, S. A., México, 1939, p. 190.

the ravines. In spite of the altitude crops can be grown in the plains and even on the mountain slopes when they are not too steep, but generally speaking conditions answer fairly the description given by F. Bach in his work on the distribution of wheath in Mexico ⁽¹⁾: "The qualitative distribution of agricultural lands is extremely poor, because in 40,000,000 acres of a total of 491,000,000 agricultural production is impossible. The unarable land consists of mountains, deserts, swamps, rivers, forests and grazing lands. There are left, in fact, only 42,000,000 acres capable of cultivation, of which 6,000,000 are remote from centers of population or means of communication. The total of agricultural land is thus reduced to 36,000,000 acres. In other words, the agricultural products consumed by the whole population of Mexico must be produced on only 7.5 per cent. of its total area. To make matters still worse, 80 per cent. of this small cultivable area depends on seasonal rains with all their disastrous consequences. Only 20 per cent. of the cultivable area is irrigated or sufficiently near rivers or lakes to benefit by their humidity". In addition to the sometimes very serious inadequacy of the rainfall over a large part of the territory, the extreme irregularity of the rains from one year to the other makes it impossible for farmers to make any forecasts, while, in the regions above 1,800 metres, the danger of early or late frosts threatens the crops from August to May.

Other factors which aggravate the adverse effects of natural conditions have their source in Mexican history; this explains why the yield of many crops has until now figured among the lowest in the world. The extensive cultivation of large estates belonging often to absentees, the backward methods practised by the small Indian farmer, the exhaustion of the soil due to prolonged cultivation of the same crops and deficient manuring, lack of credit and agricultural knowledge, are a few of the evils which the Mexican Government is now fighting under the Six Years' Plan, consisting of an agrarian reform programme which will be discussed in another article. The creation of communal holdings (*ejidos*) run on a system of intensive cultivation, the organization of rural and agricultural instruction, the diffusion of information concerning the best methods of cultivation and marketing, the development of agricultural credit, the distribution of good quality seeds, the struggle against plant diseases and pests, the encouragement of more varied cropping and the execution of extensive irrigation and road-building schemes are all means used on a large scale by the Government in an effort to increase the yield per hectare and the total output; another objective is to improve nutrition among the working classes of the population where the standard of living is still extremely low.

PRODUCTION TRENDS.

As in most of the other Latin American countries, the Mexican products which have the greatest importance at the present time for home consumption, and especially for export, are no longer the same as they were during the colonial period and even in the early days of the Republic. To mention only a few of these products, though silver exports have not lost their old importance in spite of the fact that their value is extremely dependent on the fluctuations of the international market, the rapid growth of oil exports, on the other hand, dates no further back than the first twenty years of

(1) In *The Annals of the American Academy of Political Science*, Vol. 208, March, 1940. Philadelphia, 1940, p. 73.

the present century. Among agricultural industrial products which ranked high on the export list at the beginning of the Republican era, mention may be made of cochineal which has now fallen into complete oblivion owing to the progress made in the manufacture of aniline dyes; the serious decline in the formerly flourishing output of indigo is also due to the same cause. Other crops, again, have developed to an unforeseen extent: henequen, for instance, was not grown on a large scale until 1860, while the cultivation of bananas and fresh vegetables for export has made enormous strides since 1920, though the latter has declined during the last years.

Looking at the subject from another angle, it will be seen that for some time now certain crops have abandoned their former regions of cultivation to be transferred to other regions; it is not always possible to explain the reason for this change, as it does not necessarily imply a shift to a district which is better suited to any given crop from the ecological standpoint. It has, however, been observed that the reason may some times be traced to the fact that in order to escape from some plant disease, the growing of the crop is transferred to an uninfested region, while in other cases the removal of a crop from one place to another was determined by an alteration in trade currents (¹).

VEGETAL PRODUCTS.

Cereals. — *Maize*, with dried kidney beans and green peppers, has been the staple food of the Mexican population from time immemorial; it is consumed by the natives in the form of a kind of pancake (*tortillas*), pies (*tamales*) and of fermented (*chicha*) and unfermented drinks. The maize crop represents one-third of the total annual value of all crops and covers half the cultivated area in the country. It grows everywhere up to an altitude of 3,150 m., although in different varieties with vegetative periods of varying length, but this adaptability to any environment is paid for by an exceptionally low average yield. The Section of Applied Botany in the Biotechnical Institute of the Secretariat of Agriculture has therefore commenced to study the creation of new varieties well suited to the various regions where the crop is cultivated. The total area sown to maize in 1936, 1937 and 1938 was 2,851,836, 2,090,907 and 3,090,878 hectares respectively and production in these same years was 1,507,200, 1,634,700 and 1,692,700 metric tons. A small quantity was exported in 1936, but in 1938 it was found necessary to import 220,000 metric tons, purchases of this cereal rising to 530,000 metric tons in 1939.

Wheat is grown in the tropical areas at an altitude varying between 1500 and about 3,200 metres. In the non-tropical areas the crop is of course grown at a much lower altitude. As a rule Mexico produces soft wheat and imports hard wheat, but varieties of hard wheat have also been grown recently. Wheat is grown chiefly in irrigated soil, otherwise the crop is apt to be very variable. The area sown to wheat in 1936 was 510,995 hectares, with an output of 367,608 metric tons. The corresponding figures for 1937 were 486,643 hectares and 299,436 metric tons, for 1938, 495,463 hectares and 322,376 metric tons and for 1939, 571,000 hectares and 402,000 metric tons. Wheat imports, which amounted only to 1000 metric tons in 1936, rose to 40,300

(¹) ALARCÓN, M. Ing. Adolfo, Los rendimientos agrícolas en México y su marcha en el período 1925-1934. Junio de 1936 (Instituto Mexicano de Estudios Agrícolas).

metric tons in 1937, to 896,800 metric tons in 1938 and to 510,900 metric tons in 1939. Imports of wheat flour are more or less equal to exports and in any case the volume is small.

The *oat* and *rye* crops are much smaller. The average *barley* crop for grain is around 70,000 metric tons per annum while that of barley for malting amounts only to about 6,000 tons. Since the manufacture of beer is one of the most flourishing industries in Mexico, imports of barley for malting are fairly large.

Rice, on the other hand, is steadily gaining in importance. It has been grown during the past few years over an area of about 39,600 hectares, could easily be increased, and the average annual output is approximately 80,300 metric tons. This output covers home requirements and since the quality of rice produced is excellent, some 4,220 metric tons a year are exported.

Dried kidney beans. — In 1934, Mexico ranked fourth as a producer of dried kidney beans, coming after Italy, Spain and the United States. Since then the output has fallen off a little, but Mexico is still one of the principal producers of this product. Kidney beans are grown as a rule together with maize and, like the latter, they do well in all climates and at any height. Large quantities are exported, although home consumption is also very high. Crops are, however, very unequal and imports are inevitable whenever a bad year occurs for crops as a whole, as is the case every four or five years in the non-irrigated areas. The area sown to this crop was 527,751 hectares in 1936, 546,995 in 1937 and 596,455 in 1938 with an output of 106,500, 103,800 and 105,500 metric tons in these years. Exports totalled 1,386 metric tons in 1937 while hardly any dried kidney beans were exported at all, in 1938, imports being around 310 metric tons, increasing in 1939 to as much as 3,690 metric tons.

Chickpeas. — Mexico comes third as a producer of chickpeas, following after India and Spain, although since 1931 there has been a tendency towards a reduction in the cultivation of the export varieties. Exports have always been made principally to Spain, although sometimes through the intermediary of other countries. Chickpeas are also shipped to the United States, Cuba, the Netherlands and Germany. The area sown to this crop in 1936, 1937, 1938 and 1939 was 77,390, 64,026, 88,836 and 88,485 hectares respectively, with a corresponding output of 43,237, 27,174, 55,599 and 55,700 metric tons. Exports amounted to 17,551 metric tons in 1936, 52,434 in 1937 ⁽¹⁾ and 21,937 in 1938.

Vegetables. — Vegetables are, of course, cultivated throughout the country, but export produce is grown principally in fifteen valleys situated in the States of Sonora, Sinaloa and Nayarit on the north-west coast, or, in other words, near the United States. Vegetable-growing for export originated in 1913 as a result of the demand for these products in the United States during the winter months. The latest methods are employed for the cultivation of green peas, French beans, eggplants, garlic and onions, but the chief export item is tomatoes. Exports of the last-mentioned product rose from 38,298 metric tons in 1925 to 64,174 in 1930, but have declined since then as a result of the protective duties introduced in 1930 under the Hawley-Smith tariff in

⁽¹⁾ This figure is probably a carry-over for the most part. In 1936 the Spanish war prevented exports to that country. Direct exports to Spain amounted to 2,240 tons in 1937.

the interest of farmers in Florida and Texas. Tomato exports suffered later from the general decline of exports to the United States resulting from the world economic depression and were affected anew by the conclusion of the trade agreement between the United States and Cuba in September, 1934, which granted preferential duties on imports of Cuban tomatoes. Exports of Mexican tomatoes consequently declined to 27,989, 33,610 and 21,792 metric tons in 1936, 1937 and 1938 and farmers became inclined to neglect this crop for other more profitable products. Apart from tomatoes, exports of fresh vegetables to the United States, which still totalled 15,082 metric tons in 1932, fell to 4,627 metric tons in 1936 and to 8,577 in 1937.

Potatoes are now cultivated for home consumption alone although 1000 metric tons were still exported in 1909. Imports, on the other hand, except of seed potatoes, have completely ceased.

Fruit. --- Mexico produces large quantities of wild fruits of every description, such as oranges, lemons, mangoes, prickly pears, walnuts, papaws, guavas, cherimoyas and figs. Strawberries ripen all the year round. Apples and pears, peaches, plums, melons and grapes are produced in the temperate zones. Coconut palms grow in the tropical regions along the coast and date palms in Lower California. Natural conditions are excellent, but the rational cultivation of fruit for commercial purposes requires to be improved. Lemon-growing, stimulated by heavy home consumption in the fresh state and by the industrial use of the juice and essential oil, has increased considerably along with an increase in exports. The very large output of oranges is consumed entirely on the home markets, but exports would probably flourish, since the fruit would reach the European markets just at a moment when there is a shortage of shipments from other countries. Grapefruit, pineapples and bananas are grown with increasing success. The last-mentioned fruit now ranks third in value as an export item among agricultural products, with 17,187,000 pesos in 1937. Unfortunately the banana plants have been seriously affected by Sigatoka disease (*Cercospora musae*), and the Government has organized an active campaign to combat it. An attempt is also being made to produce a variety which resists the disease satisfactorily.

Sugar. --- Vast areas of the country are suited to the production of sugar cane which has been cultivated ever since the early days of Spanish domination. Cane sugar is protected by a high import duty and the average yearly output is 312,000 metric tons.

Vanilla. --- During the colonial period Mexico may be said to have enjoyed on the European markets the monopoly of vanilla, which is a native of the country. Output and exports increased steadily until 1925, when exports reached a peak with 146 tons, worth 3,106,529 pesos. Production has declined since then, partly because the price of vanilla has fallen on the world market, represented in the case of Mexico by the United States, which is practically her only outlet, and partly because of competition on the home market from inferior and cheaper qualities of imported vanilla and from vanilline. Large quantities of excellent vanilla remain unsold and growers are turning their attention to more profitable products suitable to the same districts, such as coffee, cacao and bananas.

Coffee. --- There is a large demand for mild Mexican coffee. It is grown in various parts of the country, but only the qualities grown in the States of Veracruz, Chiapas and Oaxaca are exported. Generally speaking, the whole available crop is

absorbed for export, the yearly average of exports from 1935 to 1937 being 37,700 metric tons worth 26,614,000 pesos; this product ranks second in value, therefore, among agricultural products exported by Mexico. Coffee exports, however, only contribute 2 per cent. to the world coffee market, but the small volume of the product, together with its superior quality, prevent its being affected by competition from mass production and consequently by fluctuations on the world market due to overproduction.

Cacao. — The cacao plant, which is native to Mexico, was cultivated long before the arrival of the Spaniards and both cacao and chocolate, known by their Aztec names, reached the European markets from Mexico. The quality of the product is excellent, especially that of Soconusco cacao, but the yield per tree is low and production is far from covering home consumption; imports are consequently very large and some years (1937) are even in excess of the quantity produced in the country itself.

Tobacco. — Tobacco, which was also grown in Mexico prior to the Spanish conquest, is of good quality and that produced in the State of Veracruz is comparable to Cuban tobacco. The average yearly production is about 15,490 metric tons with a tendency to increase. The greater part of the output is consumed within the country and processed in numerous cigar and cigarette factories. Exports vary considerably from one year to another without ever attaining much importance.

The Mexican output of *fibres and oilseeds, forest products and animal products* will be dealt with in a second chronicle.

A. LENZ.

BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS

SCHILLER, KARL. *Marktregulierung und Marktordnung in der Weltagrarnwirtschaft*. Jena. G. Fischer 1940. (Probleme der Weltwirtschaft. Schriften des Instituts für Weltwirtschaft an der Universität Kiel). 454. p. RM 21..

[In the introduction to this book Dr. Schiller gives a general survey of all the reasons which necessitated the various measures of regulation in agriculture, along with an explanation of the conditions which were mainly instrumental in inducing the Governments to intervene in this particular field. According to his opinion these measures are the inevitable result of profound structural changes which took place in the agriculture of various countries dependent in some way or other upon international trade in agricultural products. On the other hand, from the social and historical point of view, Dr. Schiller considers that these measures reflect the effort made by agriculture towards the comprehensive organization of the market, thus improving its position in a domain in which, hitherto, it had lagged behind industry.

According to Dr. Schiller's opinion, the nature itself of agriculture—the relative uniformity of its production, the impossibility of substituting its products, as well as the relative stability of the consumption of agricultural produce—necessitates the bringing into operation a State control. The relative stability of consumption has also contributed to make agriculture more sensitive to the effects of mechanisation, sometimes followed by an excessively rapid increase of production. The necessity of regulation can be also attributed to the urgent needs of national defence and of ensuring adequate food supplies in case of war. Neither should it be forgotten that the influence of modern ideas, which lay stress upon the national and political importance of small agricultural property and of the peasant class contributed to the development of the modern conception of the relationship between State and agriculture. These ideas also encouraged the organizing intervention of public authorities.

One of the outstanding features of the book, to which several experts ⁽¹⁾ have contributed for the different countries, consists in Dr. Schiller's effort to establish a new method of systematic classification of the different measures of intervention in operation in various countries. He also points out that present-day economics do not possess a sufficiently exact and uniform terminology in this domain, which would facilitate such a systematic classification and would permit the bringing of the various aspects of planned economy into a reasoned system.

With this purpose in view, Dr. Schiller emphasizes the necessity to distinguish between the old procedure of agrarian and commercial policy (customs duties, export bonuses, taxes, differential freight rates, etc.) on the one hand, and modern measures and regulations, which have been enacted during the last crisis, on the other hand. The former have been applied with the sole purpose to influence favourably the various factors of the development of agriculture, without in any way interfering with the independence of its reactions in so far as prices and the volume of supply were concerned. These, according to Dr. Schiller, were the typical instruments of the control of the market in the proper sense of the word. The characteristic feature of present day measures of intervention is that they involve the compulsory regulation, more or less direct, of the various elements of the market, such as prices, supply or consumption, which are all co-ordinated in the desired sense. Although, indeed, this does not exclude free enterprise, yet, the determining factor is that it is not allowed to develop according to its own laws, but is subject to control on the part of the competent authorities.

As to the detailed classification of the numerous measures of regulation, Dr. Schiller holds that the most suitable method of classification is that based on their point of application in the course of the process through which the product passes on its way from producer to consumer, without taking into consideration the subsequent results. Thus, he distinguishes measures bearing upon the prices and quantities of imports, and those which govern prices and volume of export. Measures referring to the internal market are grouped in the following way: regulations of consumption, of prices, of supply, of production, and lastly of capital investment. Outside these categories covering all the regulations affecting the agricultural market, he includes in a separate group a whole series of measures of a general nature which exert only an indirect effect on the market and which imply the active collaboration of agriculture, such as for example standardization of products, control and supervision of quality, regulation of commercial practices and the various marketing activities of co-operatives.

In the same way as in the various measures or "techniques" of regulation, Dr. Schiller distinguishes many forms of bringing them into operation, which he calls "administrative technique".

Taking these general methodological considerations into account, Dr. Schiller proceeds to expound the subject matter of his book, which is divided into two parts. In the first part, he describes and explains country by country the various measures applied by the Governments and the changes they have undergone during the years of crisis. For the sake of greater clearness and in order to enable the reader to obtain a general view of the whole field, Dr. Schiller deals only with the most characteristic interventions in each country, leaving aside the less important. He endeavours at the same time to bring into relief the real importance of the policy of every State in relation to the position it holds in the economic system of world agriculture. For this purpose he divides the countries according to their economic character at the beginning of the crisis into seven groups:

- (1) deficitary countries (importing);
- (2) old valorizing countries of Europe;
- (3) new valorizing countries of Europe;
- (4) countries with purely agricultural economy;
- (5) agricultural countries situated on the borderline of Europe;
- (6) overseas countries of economic expansion;
- (7) overseas countries of economic contraction.

The second part of the book contains detailed investigations into the various methods of intervention mentioned above. On the basis of the experience gained in putting them into practice, Dr. Schiller seeks to determine the bearing and the expediency

(1) Dr. G. Dillner, Dr. G. Lenschow, Dr. V. Pertot, Dr. F. Schürmann-Mack, Dr. R. Stisser, Dr. A. W. Schütttauf.

of every one of the various measures of intervention and to ascertain whether they meet the needs of agricultural policy. Their efficiency depends, according to his observations, upon an infinite number of factors of the economic life of a given country, which are difficult to foresee. He lays stress on the fact that every regulation is essentially an instrument of a policy which follows its own laws and whose ultimate effects do not manifest themselves always and only in the sense envisaged by the legislator. He comes finally to the conclusion that from the point of view of the economic history of agriculture, all the complex of measures applied by various countries, does no more than presage the creation of a new market order which will come into being sooner or later.

This part of the book contains a systematic analysis of the various kinds of regulations according to their character, and in the five chapters dealing with them, in each case he gives numerous examples which demonstrate their utility, and lays stress upon what are their contributions to the economic operations of agriculture.

The book contains a detailed general introduction by Prof. G. Mackenroth.

To conclude, we must add that the book under review is remarkable not only by the wealth of the facts it contains and the conclusions it draws, but by its masterly planning and by the system of treatment of its subject.

J. Z.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

RECENT CHANGES IN THE EUROPEAN LAND SYSTEMS AND THEIR ECONOMIC AND SOCIAL CONSEQUENCES

(continuation)

CONTENTS: *Introduction.* The importance of the land system in the social organization. — *I. Transformation of the land system for the purpose of encouraging the creation of small peasant farms.* 1. Agricultural property and the farm holding. Difference between the two notions from the economic and social points of view. Examination of the statistical inquiries on agricultural landownership carried out in different countries. 2. Large and small farms in economic theory and in agricultural practice. 3. Changes in the agrarian structure of the countries of Western Europe. General observations. Land settlement in England and Wales, Scotland, Ireland, France, Germany, Italy. 4. Development of small peasant ownership in the countries of Northern Europe and in Switzerland. 5. The countries of agrarian reform. 6. Tenant farming in European agriculture. 7. Comparison of the agrarian structure of the countries of Western Europe.

3. — Changes in the agrarian structure of the countries of Western Europe.

France. — Turning from the United Kingdom and Ireland to consider the Continent, beginning with France, we find the situation in that country the very opposite of that existing in Ireland, where the transformation of the agrarian structure is of such recent date as to be almost a matter of current interest, while in France it has already become history. A very marked change took place in the grouping of the social classes in France a century and a half ago (1789), the peasantry having since played a much more active part in the nation's economic life than had previously been the case. The abolition of the feudal system led to a reorganization of agriculture, with the result that landed property became more evenly distributed than formerly.

This evolution of the agrarian structure towards an increase in the number of peasant holdings and farms did not, however, proceed without interruption throughout the whole period of transformation, as in the case of some other European countries. In 1793 the Convention granted the land to the peasants, but in 1796 and 1797 many of the confiscated properties were sold to anyone who could pay the whole purchase price in ready money, one of the reasons for this being the need to raise funds for war purposes. In 1815, after the restoration of the monarchy and the return of the "émigrés" owners of large estates, an attempt was made partly to repeal the measures of land reform, and many confiscated properties were restored to their former owners. In 1825 the payment of compensation for the expropriated estates of large landowners was enforced by law, and other similar measures were also adopted.

Nevertheless, French agriculture owes its distinctive character to the small peasant holding, which forms the basic cell of the agrarian system. Throughout

the whole of the past century and although the Government took no special measures to hasten the agrarian evolution, the social organization of agriculture changed gradually along with the general development of the country.

Table V shows the distribution of farms in France and the evolution of agriculture between 1892 and 1929, the year of the last census.

TABLE V. — *Number and Area of Farms in France and their Distribution according to total Size.*

| Size of farms | 1892 | | | | 1929 | | | |
|-----------------------------------|-------------|-------|------------|-------|-----------|-------|------------|-------|
| | Number | % | Total area | % | Number | % | Total area | % |
| | | | hectares | | | | hectares | |
| under 1 hectare | 2,235,405 | 39.2 | 1,327,300 | 2.9 | 1,014,731 | 25.6 | 724,908 | 1.6 |
| from 1 to 10 hectares | 2,617,538 | 45.9 | 11,244,700 | 24.1 | 1,863,867 | 47.0 | 9,550,284 | 20.7 |
| from 10 to 50 hectares | (1) 711,118 | 12.5 | 14,313,400 | 30.0 | 973,520 | 24.5 | 22,437,700 | 48.6 |
| from 50 to 100 hectares | (2) 105,391 | 2.4 | 22,493,400 | 43.0 | 81,844 | 2.1 | 6,126,880 | 13.3 |
| 100 hectares and over | 33,280 | | | | 32,408 | 0.8 | 7,459,477 | 15.8 |
| Total | 5,702,752 | 100.0 | 49,378,800 | 100.0 | 3,906,430 | 100.0 | 40,205,310 | 100.0 |

(1) 10 to 40 hectares. — (2) 40 to 100 hectares.

As has already been said in the first section (1) the results of the census of 1892 and 1929 are not strictly comparable because they were made according to different methods and from somewhat different points of view. Since, however, no other data are available for judging of the evolution of the French agrarian structure, recourse has to be had to the figures of these two censuses.

They show that the number of very small holdings with an area of less than one hectare has decreased considerably during the past forty years. In 1892 they still represented almost 40 per cent. of the total number of farms and their area amounted to 2.9 per cent. of the total area. In 1929 the corresponding figures were 25.6 and 1.6 per cent. The area of small holdings varying between 1 and 10 hectares also diminished a little; the number of such farms increased during the period under review, their percentage having risen from 45.9 per cent. to 47 per cent., while their aggregate area dropped from 24.1 per cent. to 20.7 per cent. of the total.

In 1892 the number of farms in the size-groups between 40 and 100 hectares (from 50 to 100 hectares in 1929) and over 100 hectares represented 2.4 per cent. of the total number of farms, and their area accounted for 43 per

(1) See: *Monthly Bulletin of Agricultural Economics and Sociology*, No. 10, October 1940, p. 327. International Institute of Agriculture. Rome.

cent. of the total. Although in the census of 1929 the number of farms in the roughly corresponding group (50 to 100 hectares) had increased to 2.9 per cent., they only represented 29.1 per cent. of the total area. Considered separately, in 1929 farms of more than 100 hectares represented 0.8 per cent. of the number of farms and 15.8 per cent. of the total area. Large farms do not play a very important part in French economy.

Turning, on the other hand, to medium-sized farms with an area varying between 10 and 40 hectares (1892) or 10 and 50 hectares (1929), we find that the number of these farms increased from 12.5 per cent. to 24.5 per cent. and their area increased from 30 to 48.6 per cent. of the total area. These farms have increased in number at the expense of both large farms and very small holdings.

If, instead of percentages, we take absolute figures, we find that the very small holdings with an average area of 0.7 hectares, which may scarcely be looked upon as economic units, number over a million. This is doubtless due, among other reasons, to the division of holdings under the succession laws of the Code Napoléon, which has efficiently prevented agricultural property from becoming concentrated in the hands of a few owners; on the other hand, the provisions of the Code have led to the creation of such very small holdings that the flight from the land has been greatly encouraged.

From 1892 to 1929, or in other words, during the period which elapsed between the two last censuses, the number of farms in France decreased by 1,730,000 units, or about 30 per cent. At the same time, the total area decreased from 49,378,800 hectares to 46,205,319 hectares, so that during a period of about forty years 3,173,481 hectares of land went out of cultivation. "This diminution, estimated in 1936 at 3,093,200 hectares, according to M. Augé-Laribé, "was due to an increase - which would not appear at all unlikely - of 940,000 hectares, in the wooded area; to an extension - equally likely - of 1,160,000 hectares in the land diverted from agricultural uses to towns, roads, railway, etc. and, finally, to an increase of 1,694,600 hectares in the area of land lying waste" (1).

Government intervention in the evolution of the agrarian structure has latterly taken the form of legislative measure tending to create more favourable conditions for the development of small holdings. In this connection, mention should be made in the first place, of the law of August 5, 1920, which empowered the *Caisse Nationale de Crédit Agricole* to grant long-term loans not exceeding 60,000 francs for the purpose of facilitating the purchase, improvement, transformation and establishment of small farms. Some 80,000 families, mostly of ex-servicemen or War victims, have taken advantage of these loans since the Great War.

Mention should also be made of a decree-law dated May 24, 1938, intended to favour the development of small rural properties as distinguished from small farms. This decree-law provides for the creation of a system of purchase of small holdings by instalments offering wage-earners the possibility of acquiring

(1) « Structure agricole », *Revue d'Economie Politique*, No. 1, Paris, 1939, p. 103.

a small rural property for their old age. In return for annual contributions varying between 100 and 1,000 francs and capitalized by the *Caisse Nationale de Crédit Agricole* and by the State at interest rates graduated from 7 to 10 per cent., beneficiaries under this law are enabled to purchase or equip a home for their old age in some rural commune (communes with less than 2,000 inhabitants).

Holders of instalment books under this system who, at the time of payment of their contributions have at least three legitimate children alive and under 16 years of age, are entitled to a 25 per cent. bonus on their instalments; holders of this type of book with at least five children are entitled, under the same conditions, to a 50 per cent. bonus. These bonuses are at the charge of the Treasury, the money being advanced by the *Caisse Nationale de Crédit Agricole* and refunded to the latter monthly from special credits opened for the purpose in the budget of the Ministry of Agriculture. The full amount of the bonuses is credited to the holders of the instalment books. They cannot be capitalized and are payable only on the completion by the holder of the purchase or equipment of his rural property.

It would be interesting to have more complete figures concerning the area of land bought by the peasants after the war. Unfortunately, however, no information is available on this subject either. M. Caziot in his report entitled « Le bénéfice agricole et les charges fiscales de l'agriculture », written in 1923 for the XI International Congress of Agriculture held in Paris, states that the value of land purchased by peasants amounted to 6 milliard francs during the period from 1918 to 1922. Assuming that after the war the average price of one hectare of land was 6,000 francs, the area of land purchased by the peasants probably worked out at about 1,000,000 hectares. This figure, however, is no more than a rough approximation and is quoted as such.

Germany. — The agrarian structure of the various regions of Germany is, as a rule, less uniform than in France; a feature which, in the past, was even more marked than it is now. Large farms are especially numerous in the eastern parts of the Reich. In the West and the South-west small and very small farms predominate, while in the North-west and the South-east there is a large proportion of large and medium sized peasant farms.

The emancipation of the peasants and its consequences. — The differences in the agrarian structure of the various regions of Germany are so many and varied that space does not permit of dealing with them in detail.

In order to gain better insight into the German settlement policy it will suffice to say that after the emancipation of the Prussian peasants, planned and commenced between 1807 and 1811 in such a broad-minded spirit by Stein, but radically altered by his successor Hardenberg whose predilection for the large farm is wellknown, numerous peasants lost their land.

The emancipation of the peasants in East Prussia was, as a rule, accompanied by the cession to the landlord as compensation of one third of the land in the case of hereditary holdings and of one half of the land in the case of non-hereditary holdings. Consequently the emancipation of peasants in East Prussia

actually resulted in an increase in the area of large estates. In the other parts of Germany the former feudal landlords were mostly compensated in money so that the small farms held by the peasants were transformed into small peasant properties.

The protection given by Frederick the Great to the peasants in Prussia was not continued after this reform. The Prussian *Landschaften*, one of the most important of Frederick's initiatives in agrarian policy, certainly favoured the large estate, since they had been established essentially for the purpose of meeting the need of the landed gentry for mortgage credits ⁽¹⁾. But Frederick the Great's agrarian policy sought, if only for demographic and military reasons, to protect peasant property and prevented landowners from appropriating land belonging to peasants with a view to its incorporation with their estates.

In connection with the emancipation of the peasants the following words from a book by Prof. Konrad Meyer may be quoted: "Although originally it was intended not only to give the peasant personal freedom, but also to confer upon him the full ownership of his holding, save for the legal fixation of a limit to the debts he was permitted to contract, such a settlement proved impossible with regard to the peasants dependent on the estates of the landed nobility as a result of the resistance of the latter, as well as of Hardenberg's predilection for the ideas of the physiocrats who were partisans of large farming" ⁽²⁾. ³

The loss of land suffered by the peasants as the result of emancipation in the Eastern provinces and in Saxony worked out at nearly one million hectares. To this should be added a further 440,000 hectares of land belonging to peasants which was purchased by large landowners on the open market between 1816 and 1865. The total area of land lost by the peasants in Eastern Germany during this period amounts therefore to over 1.3 million hectares.

Geographical distribution of farms. — The differences in the agrarian structure which resulted from the above conditions may be seen from the geographical distribution of the various size-groups of farms in Germany at the time of the first farm census taken in 1882, some years before the beginning of the land settlement scheme inaugurated in 1886. This is clearly seen from following table VI ⁽³⁾.

From the above table it will be seen that in 1882 the large farms of 100 hectares and over accounted for 24.4 per cent. of the cultivated area in Germany taken as a whole, while the proportion for Prussia alone was 31.7 per cent.

These percentages rise to 38.6 in the province of East Prussia, to 47.1 in the Province of West Prussia and to 55.3 in the Province of Posen. In this last-mentioned province, in fact, more than one half of the cultivated area belonged to the large estates. In the western provinces of Prussia, on the other

⁽¹⁾ M. TCHERKINSKY: *The Landschaften and their mortgage credit operations in Germany (1770-1920)*. International Institute of Agriculture. Rome, 1922.

⁽²⁾ KONRAD MEYER: *Gefüge und Ordnung der deutschen Landwirtschaft*. Berlin, 1939, pp. 732-733.

⁽³⁾ STATISTIK DES DEUTSCHEN REICHES. *Landwirtschaftliche Betriebsstatistik*. Published by the Imperial Statistical Office, Berlin, 1885, p. 25 et ss.

TABLE VI. — *Area, per 100 Hectares of agricultural Area, of Farms belonging to the various Size-groups in Germany, and in its various States and Provinces in 1882 (in hectares).*

| States and Provinces | Under 1 hect. | Between 1 and 10 hect. | Between 10 and 100 hect. | 100 hect and over |
|--------------------------------|---------------|------------------------|--------------------------|-------------------|
| Provinces : | | | | |
| East Prussia | 1.0 | 9.3 | 51.1 | 38.6 |
| West Prussia | 1.3 | 9.1 | 42.5 | 47.1 |
| Pomerania | 1.3 | 10.1 | 31.2 | 57.4 |
| Posen | 1.4 | 10.8 | 32.5 | 55.3 |
| Silesia | 1.9 | 26.5 | 37.1 | 34.5 |
| Saxony | 3.2 | 19.8 | 50.0 | 27.0 |
| Hanover | 2.9 | 26.9 | 43.3 | 6.9 |
| Westphalia | 4.3 | 33.1 | 57.8 | 4.8 |
| Rhenish Prussia | 5.5 | 52.0 | 39.8 | 2.7 |
| Kingdom of Prussia | 2.2 | 19.8 | 46.3 | 31.7 |
| Kingdom of Bavaria | 1.6 | 35.6 | 60.5 | 2.3 |
| Grand Duchy of Baden | 4.6 | 62.3 | 31.3 | 1.8 |
| German Reich | 2.4 | 25.6 | 47.6 | 24.4 |

hand, in Hanover, Westphalia and Rhenish Prussia, as well as in Bavaria and the Grand Duchy of Baden, the proportion of cultivated land in farms of 100 hectares and over, was very low, fluctuating between 1.8 and 6.9 hectares and was much lower than the average for Germany as a whole and especially than that for Prussia.

Turning to the size-group of small holdings between 1 and 10 hectares, we find a situation which is the reverse of the above. While the average for the whole country is 25.6 per 100 hectares, it falls to 19.8 in Prussia, 9.1 in the Province of West Prussia; it rises to 33.1 hectares in Westphalia, to 35.6 hectares in Bavaria, to 52.0 hectares in Rhenish Prussia and to 62.3 in the Grand Duchy of Baden.

On the whole, as we can see from the above, the characteristic feature of the geographical distribution of the farms in 1882 was that the area of the farms increased from the West and South towards the North and East of Germany.

Under these circumstances, the establishment of a better balance in the agrarian structure of the various parts of Germany became an absolute necessity from the standpoint of both agrarian economy and social policy.

The three land settlement periods. — A deliberate land settlement policy has been pursued in Germany for more than half a century, and its history may be divided into three main periods: the first, which began in 1886 under Bismarck and lasted until the end of the Great War, was prompted chiefly by ethnic motives; the second, based on the Weimar constitution, lasted from 1919 to 1933 and was influenced chiefly by considerations of social policy; lastly, the third, dating from 1933, was inspired by national and racial ideas.

First period. — Under the land settlement laws of 1886 and 1890-91, the allocation of land to new settlers could be done in one of the three following forms:

- (1) Lease;
- (2) Purchase outright;
- (3) *Rentengut*, involving the transfer of ownership in return for the payment of a fixed annual sum.

This last type of contract, which offered to agriculturists the advantages of tenancy and ownership combined, was preferred in almost every case. The transformation of the purchase price into a payment combining interest and an instalment of the capital sum calculated on the basis of the repayment of the debt in a period varying from 50 to 60 years, was carried out through the provincial *Rentenbanken*. Special clauses provided for efficient management and Government supervision.

To prevent the division of this type of holding, the law of June 8, 1896, provided that it should pass to one heir. The compensation of co-heirs was assured by the *Rentenbank* issuing to them, on demand, bonds secured by a mortgage upon the holding. It must, however, be said that, in spite of partial success, the results achieved during this period were on the whole disappointing. Of over one million hectares of peasant land which had been incorporated with the landowners' estates between 1811 and 1860, only about 600,000 hectares had been recovered in the form of some 44,000 *Rentengüter*. This in spite of the fact that the legislative, financial and technical carrying-out of the scheme was quite satisfactory.

These figures lose even more of their importance when compared with the increase in the area of fideicommissa, which amounted to 20,000 hectares annually. Consequently, every year an area nearly equal to that made available for settlement was withdrawn from the market. In 1914 in Prussia, there were 1,311 fideicommissa representing 2 ½ million hectares of untransferable land or 7.1 per cent. of the total area. This obstacle was not removed until after the Great War, when fideicommissa were abolished by the Prussian decree of May 13, 1919, the reform being completed by the Reich Law of July 6, 1938.

The second period. — The second period of land settlement was governed by the Law of August 11, 1919, concerning Land Settlement in the Reich ⁽¹⁾. Prof. Sering, the sponsor of this enactment, in the report explaining its objects, stated that "the economic situation of Germany after the war makes it absolutely essential that the small farms should be increased in number and encouraged. They employ, feed and support many more people than do the large and the medium-sized farms; they fulfil all the conditions required for an intensive exploitation of the soil. The small farm is capable of supplying the nation's economy with the largest possible amounts of bread and other foodstuffs if it is adequately supported by co-operative institutions and other institutions of public utility".

(1) Dr. H. BÜCKER and F. W. VON BÜLOW: L'exode rural en Allemagne. International Institute of Agriculture and International Labour Office. Rome, 1933, p. 99 et seq.

The Reich Law required the constituent states (*Länder*) to open up their domanial lands for settlement as soon as the existing leases expired, unless their conservation was considered useful for purposes of professional training, for advancing experimental work or for other purposes of public interest, either economic or general.

In addition to domanial lands, marshy areas and waste ground, great areas of land were claimed for settlement from big landowners. The latter were exempt from compulsory expropriation only if one-third of the aggregate cultivated area of the large estates in the district concerned was already used for land settlement, or unless estates of over 100 hectares did not account for more than 10 per cent. of the total cultivated area in the district.

With a view to making land belonging to large estates available for the land settlement associations, the Reich Law set up a new institution: the associations for providing land (*Landlieferungsverbände*). These institutions set up in the constituent States, in provinces or in districts, are associations of large landowners which, at the request of the land settlement organization, are bound to place at its disposal land suitable for settlement forming part of large estates and which enjoy in this connection the legal rights of pre-emption and of expropriation.

The principal innovations introduced by the above Law consist in the measures regarding the occupation of lands adjoining existing farms (*Anliegersiedlung*) by which existing small holdings could be so extended as to enable them completely to support the families living on them.

Generally speaking, this period showed better results than the preceding pre-war period.

Between 1919 and 1933, an area of 1.04 million hectares was acquired for settlement; 821,552 hectares were actually settled: 662,407 hectares were used for the creation of 62,371 new holdings and 159,145 hectares for the enlargement of 104,627 existing farms.

Land for settlement was obtained from the following sources: some 77 per cent. came from private estates of more than 100 hectares; 10.4 per cent. from other estates of less than 100 hectares; 9 per cent. from public bodies and, lastly, 3.6 per cent. from marshy areas and waste ground brought into cultivation. The average costs incurred for each new holding worked out at 23,000 RM.

Third period. — The land settlement policy of the third period has been strongly influenced by theories, the principles of which are embodied in the Law of September 29, 1933, on Hereditary Peasant Holdings (*Erbhofgesetz*). This measure modified both the land system and the laws of inheritance. All agricultural or forest property sufficient to keep a peasant family, with an area of at least 7.5 hectares and, as a rule, not exceeding 125 hectares is declared to be a peasant holding in the sense of the law and is entered in the Land Register as such, if it belongs to a person qualified to bear the title of peasant (*Bauer*). The owners of hereditary peasant holdings can alone bear this title. All other farmers are described as agriculturalists (*Landwirte*).

A hereditary peasant holding may not be transferred, encumbered or divided, except for some serious reason and with the approval of a special court (*Anerbengericht*). Forced sale of these holdings is also forbidden.

There actually exist about 700,000 of these hereditary peasant holdings, representing 22.3 per cent of the total number of farms; they cover roughly 15.56 million hectares of the territory of the old Reich. This means about 37 per cent. of the total agricultural and forest area, and if only the agricultural area is considered—for the share of the wooded area increases in proportion to the size of the farm—these holdings cover about 47 per cent. of the total agricultural area.

Nearly three quarters of all hereditary peasant holdings are situated in the west. The size of these holdings, which, on an average for the Reich, amounts to 20 hectares of total area and 14 hectares of agricultural land, diminishes steadily from east to west-south-west.

As far as possible it will be sought to increase the area of small holdings by the incorporation of adjacent land, by the enclosure of scattered strips and, if no other means are available, by lease, until they attain the size of hereditary peasant holdings.

With a view to increasing the area of agricultural and forest land which can be cultivated by independent peasants, the liquidation of fideicommissa has been carried out. As has already been said, the Law concerning the Extinction of Fideicommissa was promulgated in Germany on July 6 and in Austria on October 1, 1938. All family fideicommissa were thereby abolished. It affected some 600 fideicommissa in Germany with a total area of 1.4 million hectares and 164 estates aggregating 293,000 hectares in Austria, or about 3 per cent. of the total area of agricultural and forest land. Henceforth, there will be only one form of property subject to a special régime of succession, namely, the hereditary peasant holding. Only in exceptional cases will it be possible to convert properties of over 125 hectares into hereditary peasant holdings, where all the other essential conditions are complied with.

From Table VII an idea may be obtained of the development of land settlement in Germany during this third period.

TABLE VII. — *Development of Land Settlement in Germany during the Period from 1933 to 1939.*

| Year | Newly established farms | | Enlargements obtained by the incorporation of adjacent land | |
|-------------------------------|-------------------------|------------------|---|---|
| | Number of farms | Area in hectares | Number of holdings enlarged | Area of land incorporated with holdings |
| 1933 | 4,914 | 60,297 | 8,480 | 17,047 |
| 1934 | 4,931 | 74,102 | 13,054 | 27,056 |
| 1935 | 3,905 | 68,338 | 13,150 | 23,145 |
| 1936 | 3,308 | 60,358 | 10,782 | 22,044 |
| 1937 | 1,894 | 37,506 | 10,793 | 21,400 |
| 1938 | 1,456 | 27,834 | 7,818 | 10,950 |
| 1939 ⁽¹⁾ | 798 | 17,900 | 5,041 | 12,000 |

(1) Provisional data.

During the past few years the rate of progress of land settlement has slowed down somewhat. Dr. H. Reischle ⁽¹⁾ attributes this to the following causes: "The law on hereditary peasant holdings and the law on the constitution of new peasant holdings have so far not produced the same results. While the law on the hereditary peasant holding has been applied without difficulty, the progress in the establishment of new peasant holdings has suffered a certain setback. Peasant settlement has up to the present come up against material difficulties and against the resistance of interested parties. The lack of willingness on the part of the large landowners to give up the land to be used for the encouragement of settlement of their own accord, is not sufficiently counteracted by the legal provisions concerning the systematic obtention of land and its settlement, which differed in this respect from those rendered necessary by military considerations. The economic reasons sometimes brought forward against the creation of new peasant holdings are often no more than the expression of an active opposition against peasant settlement. This personal resistance to the establishment of new peasant holdings is reinforced by the material difficulties which have been particularly felt during these last few years. Special mention should be made of the extensive requisition of land for reasons connected with national policy. This has, on the one hand, led to the transfer from one region to another of many people who have consequently taken up their residence in a new district and, on the other, it has decreased the area of arable land by about 700,000 hectares, *i. e.*, by an area which could have fed nearly one and a half million inhabitants. Another result of the requisition of land for the above purposes has been a considerable rise in land prices".

The price of land purchased for settlement has increased considerably during the past few years. The average price paid in 1932 was 643 RM per hectare, rising to 669 in 1933, 709 in 1934, 905 in 1935, 991 in 1936, 1,111 in 1937 and 1,457 RM in 1938. Prices have therefore doubled between 1932 and 1938.

During the second half of 1939, the war added new difficulties to those which were already encountered by land settlement; the use of building materials was subjected to restrictions, the staff employed by the settlement organizations was reduced, etc. ⁽²⁾

The decline which has taken place in the creation of new farms during the past few years has enhanced the importance of the problem of enlarging existing holdings by the incorporation of adjacent land. During the second settlement period, from 1919 to 1932, an average of 6,868 small holdings a year were enlarged by the incorporation of 10,016 hectares. During the third period, the average number of holdings enlarged rose to 10,016 and that of the area incorporated to 19,897 hectares ⁽³⁾.

During the two last settlement periods (1919-1933 and 1933-1939), 1,575,522 hectares in all have been used for settlement purposes; 11 per cent. of this

(1) "Neubildung deutschen Bauerntums auch wirtschaftspolitisch notwendig". In the review *Neues Bauerntum*, B. 6 Berlin, June 1939, p. 159.

(2) *Wirtschaft und Statistik*, Part I, No. 11, Berlin, June 1940.

(3) *Nationalsozialistische Landpost*, Berlin, July 12, 1939.

area was obtained from property belonging to the States and the Reich, and 89 per cent. from private landowners and communes. On January 1, 1940, the land settlement associations had still 107,300 hectares of land available for settlement.

The average size of the new peasant holdings between 1919 and 1932 was 10.5 hectares; it increased during the following years to 19.9 hectares in 1937 and fell again to 19.1 in 1938. While between 1919 and 1932 only 45 per cent. of all the new holdings measured 10 hectares or over, the figure rose to 73 per cent. between 1933 and 1939.

General tendencies of the changes in agrarian structure. — The evolution of the agrarian structure of Germany during the past sixty years could be followed by means of the six farm censuses taken in that country in 1882, 1895, 1907, 1925, 1933 and 1939. The methods adopted in taking these censuses show certain differences in particulars. The comparison of the results of these censuses, however, puts in sufficient relief the main features of the evolution of the holdings belonging to different size groups from 2 hectares on. It is, however, impossible to compare the figures for holdings of less than 2 hectares, since the lower limits of this group in the various censuses were not the same.

The development of farms with an area of 2 hectares or more between 1907 and 1933 may be seen from the following table where the farms are grouped according to agricultural area. In order to make comparison possible, the results of the agricultural census of 1907 have been recalculated by the Statistical Office of the Reich on the basis of the post-war territory of Germany. No such reduc-

TABLE VIII. — *The Evolution of Holdings of 2 Hectares and over in Germany from 1907 to 1933.*

| Classification by size of agricultural area | 1907 | | 1925 | | 1933 | |
|---|------------|------------|--|------------|---|--|
| | Number | Number | Increase or decrease compared with 1907 | Number | Increase or decrease ¹ compared with 1925 | |
| From 2 to 5 hectares | 886,455 | 894,454 | + 7,999 | 831,417 | — 63,037 | |
| " 5 to 20 " | 930,785 | 956,155 | + 25,370 | 1,048,954 | + 92,799 | |
| " 20 to 100 " | 228,456 | 199,825 | — 28,631 | 231,013 | + 31,188 | |
| 100 hectares and over | 18,933 | 18,668 | — 265 | 18,404 | — 264 | |
| Total of holdings of 2 hectares and over . | 2,064,629 | 2,069,102 | + 4,473 | 2,129,788 | + 60,686 | |
| <i>Total area of holdings</i> | | | | | | |
| From 2 to 5 hectares | 3,852,957 | 3,970,830 | + 117,873 | 3,007,737 | — 363,093 | |
| " 5 to 20 " | 12,157,536 | 12,761,184 | + 603,648 | 12,952,306 | + 191,122 | |
| " 20 to 100 " | 11,088,566 | 9,970,172 | + 1,118,394 | 11,037,014 | + 1,066,842 | |
| 100 hectares and over | 8,017,549 | 7,732,203 | — 285,346 | 7,527,389 | — 204,814 | |
| Total of the area of holdings of 2 hecta- res and over. . . . | 35,116,608 | 34,434,389 | — 682,219 | 35,124,446 | + 690,057 | |

tion, however, has been made for the data of the censuses of 1882 and 1895, so that these cannot be compared with the results of censuses taken in Germany after the War. As to the census of 1939, the data at present available for holdings have been obtained by grouping them according to total area. In table IX these data are compared with those of the census of 1933, in which holdings are grouped according to both total and agricultural area.

The decline registered in 1933 in the number and total area of small holdings between 2 and 5 hectares, as compared with the 1907 figures, is explained partly by the fact that, as a result of enlargement, many farms which belonged to this size-group had passed into a higher group.

Again, during this period there was a decline in the number and total area of the large farms of 100 hectares and over. The breaking up of these farms, which are worked by hired labour, was largely due to the exodus of rural labour and to their being burdened by debts which weigh heaviest during periods of economic uncertainty.

The number of farms with an area between 20 and 100 hectares had increased slightly in 1933 compared with the 1907 figures, but their area had decreased by 51,552 hectares.

On the other hand, the steady increase registered in the number and area of medium-sized peasant holdings between 5 and 20 hectares was partly due to enlargement of the smallest holdings and partly to the land settlement policy of the Government, these holdings being better adapted to overcome periods of agricultural depression since they are operated by the family.

TABLE IX. — *Comparison of the Distribution of Holdings by Size-groups on the Basis of the last two Censuses taken in 1933 and 1939⁽¹⁾ in Germany.*

| Classification according to total area | Holdings | | | Total area | | |
|---|-----------|-------------|---|------------|-------------|---|
| | 1939 | 1933 | Increase or decrease compared with 1933 | 1939 | 1933 | Increase or decrease compared with 1933 |
| | number | number | % | hectares | hectares | % |
| From 0.5 and under 1 hectare | 482,812 | (2) 366,839 | + 31.6 | 342,525 | (2) 269,069 | + 27.3 |
| " 1 " " 2 " | 476,264 | 482,379 | — 1.3 | 679,777 | 681,651 | — 0.3 |
| " 2 " " 5 " | 762,621 | 796,790 | — 4.3 | 2,529,105 | 2,611,679 | — 3.2 |
| " 5 " " 10 " | 619,149 | 621,952 | — 0.5 | 4,429,101 | 4,378,142 | + 1.2 |
| " 10 " " 20 " | 486,329 | 451,663 | + 7.7 | 6,922,831 | 6,285,398 | + 10.1 |
| " 20 " " 50 " | 281,719 | 267,310 | + 5.4 | 8,382,432 | 7,954,770 | + 5.4 |
| " 50 " " 100 " | 55,061 | 54,572 | + 0.9 | 3,666,841 | 3,624,689 | + 1.2 |
| " 100 " " 200 " | 16,897 | 16,600 | + 1.8 | 2,305,680 | 2,264,310 | + 1.8 |
| " 200 " " 500 " | 10,413 | 10,623 | — 2.0 | 3,321,038 | 3,315,874 | + 0.2 |
| " 500 " " 1000 " | 3,846 | 3,919 | — 1.9 | 2,618,339 | 2,696,216 | — 2.9 |
| 1,000 hectares and over. . . . | 2,846 | 2,807 | + 1.4 | 7,481,077 | 7,484,987 | — 0.1 |
| Total . . . | 3,197,957 | 3,075,454 | + 4.0 | 42,678,746 | 41,566,785 | + 2.7 |

(1) Territory of 1937. — (2) From 0.51 and under 1 hectare.

Source: *Monthly Crop Report and Agricultural Statistics*, No. 9, September 1940, p. 607. International Institute of Agriculture, Rome.

The last census taken in 1939 shows that the total number of farms of over 0.5 hectares in Germany is 3,901,843, with an aggregate area of 53,293,188 hectares. A comparison between this census and that of 1933 can only be made for the Reich within the 1937 frontiers.

Between 1933 and 1939 the number of farms had increased by 122,503, while the increase in their total area was 1,111,961 hectares. The increase is due in part to the improvement in the methods of registration, which made possible the inclusion without a single exception even of the smallest holdings which have escaped registration in the previous censuses. Apart from this, the general tendencies of the evolution of German agrarian structure shown by the census of 1939 were the same as in the past: a decline in the extreme size-groups of large and small holdings, and an increase in medium-sized peasant holdings at the expense of both.

Italy. — In Italy, especially after the outbreak of the Great War, important changes took place in the traditional agrarian structure, such as the increase in small ownership. This development may be divided into two distinct periods. The first embraces the ten to fifteen years which followed the War and during which peasant holdings were established spontaneously, without State intervention of any description. This process has already been completed. The second period is very recent, as it dates no further back than the last few years. Unlike the first period, in this case the Government intervened actively with a view to providing land for those who were anxious to cultivate it themselves.

First period. — The land purchased by the peasants during the first period (1919-1933), amounted to about 1 million hectares, or about 6 per cent. of the whole cultivable area in Italy. As will be seen from the following table, the proportion of land purchased differed considerably from one region to another ⁽¹⁾.

TABLE X. — *Area of Land which passed to Peasants in the various Regions of Italy.*

| Regions | Cultivated area in hectares | Land purchased | |
|-----------------------------------|--------------------------------|---------------------------------|-----|
| | | Absolute figures in hectares | % |
| Northern Italy | 6,332,010 | 450,183 | 7.1 |
| Central Italy | 3,189,216 | 115,540 | 3.5 |
| Southern Italy | 4,394,899 | 230,973 | 5.3 |
| Islands | 2,626,751 | 156,002 | 5.9 |
| (a) Sicily | 1,968,497 | 153,892 | 7.8 |
| (b) Sardinia | 658,254 | 2,200 | 0.3 |
| Total for the whole country . . . | 16,342,882 | 948,698 | 5.7 |

⁽¹⁾ I. LORENZONI, Prof. G.: *Inchiesta sulla piccola proprietà coltivatrice formatasi nel dopoguerra. Relazione finale. L'ascesa del contadino italiano nel dopoguerra.* Istituto Nazionale di Economia Agraria. Rome, 1938, p. 10.

A glance at the columns of absolute figures shows that the largest area of land, or about half the total purchased, was acquired in northern Italy. Relatively to the total cultivable area of each region, however, we find the highest percentage, 7.8 per cent., in Sicily.

That so much land could be purchased by peasants on the open market is due in part to the fact that in Italy the land is not, as for instance in Germany, subject to the law of undivided succession (*Anerbenrecht*) and that up to the time of the publication of the new Civil Code at the beginning of 1940 no restrictions had been imposed upon the division of landed property.

An average of 4,400 lire per hectare was paid for the land, the total purchase price amounting therefore to some 4,500 million liras.

The funds used by the peasants for the purchase of land came largely from the savings of Italian emigrants in America. Between 1902 and 1925 emigrants' remittances totalled 22,000 million liras. Calculated at the post-war rate of the lire to the dollar, this sum was equivalent to about 1,000 million liras a year on the average. Even if the figure should be slightly reduced "it would always suffice", to quote Prof. Lorenzoni, who was responsible for the direction of the extensive survey of agrarian transformation recently carried out in Italy with conspicuous success, "to show the tremendous importance that these remittances must have had, before and after 1915 and especially between 1919 and 1925, to enable them to bring about the developments we are studying, and which reached their maximum intensity during that period" (1).

Out of 250,000 hectares of newly purchased land, some 125,000 new peasant holdings were formed, with an average area of some 2 hectares each. Roughly 750,000 hectares went to enlarge 375,000 peasant holdings. These figures are only approximative, as no accurate data are available on this subject, but they found indirect confirmation in the results of the censuses of the population of 1921 and 1931.

The following passage gives the opinion of the review *Bonifica e Colonizzazione* (2) on this vast work of transformation: "Its importance does not lie alone in its extent (nearly one million hectares have passed into the hands of the peasants), but consists also in the fact that this phenomenon points to a much more pronounced process of transformation among the agricultural classes involving a real revolution which is being accomplished now by the Italian peasants who, after having commenced on radical and revolutionary lines, are now accomplishing it with the aid of the present economic and monetary situation, on bourgeois and conservative foundations. The objects in view are, over and above the acquisition of land, a temporary improvement in the standard of living, a large scale improvement in rural housing, alteration of farm contracts, the temporary disappearance of a large part of the old agricultural indebtedness, etc. The efforts which the Italian peasants had doggedly been making to improve their living conditions before the war, and which, according to the various regions, times and conditions, were made by means of peasant organiza-

(1) LORENZONI, *op. cit.*, p. 180.

(2) No. 11, Rome, 1939, pp. 929-30.

tions or of emigration, suddenly appears to have been crowned with success after the war. And the old undying land hunger of the peasants, which formed the main, if not the only objective of this effort, found ample satisfaction between 1919 and 1926".

Small holdings for ex-servicemen. — The establishment of small holdings for ex-servicemen has formed the object of the activities of the *Opera Nazionale Combattenti* (National Institute of Ex-Servicemen), founded and incorporated in Rome in 1919. The organization is the owner of property consisting of land freely purchased or made over to it by special enactments, together with Crown lands ceded by the Crown.

The law also gives the organization the right to apply for compulsory expropriation of land, to whomsoever it may belong, if it is in need of reclamation, if it appears to be suitable for important improvement schemes or for the establishment of industrial enterprises closely connected with the agricultural activity of the Institute, or again for the establishment of villages or settlements.

All land rendered fit for cultivation by the organization is ceded to cultivators under contracts which enable the tenant farmers to become owners after a trial period of varying length, if satisfactory results are obtained. A clause in the contract also obliges the concessionary to effect improvements on the land. The concessionary pays a quarter or a fifth of the agreed price when the contract is signed, the remainder being payable in ten annual instalments. In this way, thousands of farm labourers have become small proprietors through the Institute.

Second period. — Although in the after-war period the proportion of land purchased was highest in Sicily (7.8 per cent. of the whole area), this region, with its 154,000 hectares of land newly broken up into small holdings, still ranked only fourth among the various regions of Italy. On the other hand, the agrarian transformation during the second period is concerned mostly with the old Sicilian *latifundia*.

"The Sicilian *latifundia*", says Prof. Tassinari ⁽¹⁾ "are characterised by the remarkable size of farms combined with a striking smallness of capital invested; sometimes an unending vista of monotonous undulations stretches across the *latifundia* as far as the eye can reach, unbroken by a single tree or cottage.

"The farm labourers live far from the land they cultivate, grouped together in widely scattered but large villages; only during certain seasons, when special types of work are called for, does the peasant spend the night on the estate where the lack of buildings compels him to sleep in huts or in the open, protecting himself from the weather as best he can, but always at the mercy of the dangerous malaria-bearing mosquito....

"Another characteristic feature of the Sicilian *latifundia* is the absence of continuous direct relations between the landowner and his estate. As a rule, the absentee proprietor leases his estate to an intermediary (*gabellotto*) who all too often does not play the economic part of the farm entrepreneur, found in the other Italian regions, but is merely a speculator who exploits the owner

(1) TASSINARI, Prof. G.: *Saggi intorno alla distribuzione del reddito nell'agricoltura italiana*. Piacenza, 1926, pp. 127-129.

of the *latifundium*, on the one hand and, on the other, the farm labourer in urgent need of a holding to lease".

According to the 1930 agricultural census, there were in Sicily 452,419 farms with a total area of 2,101,490 hectares. Of these farms, 2,034 covered an area of 591,209 hectares distributed as follows: 1,806 farms of between 100 and 500 hectares covered a total area of 362,566 hectares; 164 with an average area varying between 500 and 1,000 hectares occupied 109,166 hectares, while 64, covering a total of 119,477 hectares, had each an average area of more than 1,000 hectares⁽¹⁾. The *latifundia* as a whole cover about one-third of the whole agricultural area of the island.

The reasons of the survival of *latifundia*. — It may be interesting to point here briefly to the basic reason for this concentration of land in the hands of a few owners, which has survived throughout the centuries.

The causes of this economic anachronism lie in the first place in natural conditions — scarcity of water, droughts, the nature of the soil which is composed for the most part of clay and the unhealthy character of the region, where malaria is so prevalent as to make permanent residence in many localities practically impossible. Among the economic and social reasons which have encouraged the continuance of the *latifundia*, mention should be made of the lack of roads and hygiene, absenteeism, etc. All these unfavourable circumstances seemed until only a short while ago to be destined to continue for ever, and to make the huge Sicilian estate eternal.

The reasons for the transformation of the *latifundia*. — The economic evolution of the post-war period, however, compelled those in authority to study anew the reasons for the survival of the Sicilian *latifundia*. The external stimulus to these studies had been provided by the steady decline and, later, the complete interruption of Italian emigration, especially from Sicily.

Sicilian emigration commenced in 1900 with only 28,838 emigrants, but by 1907 the numbers had increased to 127,603. The savings sent home in that year amounted to about 106 million liras.

During the Great War emigration naturally ceased in Sicily as well as elsewhere. When it began again in 1919 the number of emigrants totalled 36,476 rising, to 108,618 in 1920 and falling to only 23,000 in 1921.

Emigrants' remittances in Southern Italy and Sicily in particular came to about 721 million liras in 1921, 525 million liras in 1922 and 679 million liras in 1925; consequently, nearly 2 milliard liras entered the country in these three years alone through the above regions. It was these savings which enabled the peasants to purchase about 140,000 hectares of land on the open market between 1919 and 1930. But the immigration quotas imposed in America put an almost complete stop to emigration, and it was not until 1935 that the number of emigrants from Sicily reached even the modest figure of 1,893.

(1) *Annuario statistico dell'agricoltura italiana*, 1936-38. Istituto Centrale di Statistica del Regno d'Italia. Rome, 1940, pp. 85 and 97.

As soon as factors of an international nature, such as emigration, ceased to provide the Sicilian peasants with the means necessary for the purchase of holdings, the need became much more pressing to devise adequate measures of national policy with a view to making use of the productive capacity of the Italians who had remained at home, by means of a carefully prepared scheme carried out by the Government itself. When the emigration policy pursued previously was abandoned, it became necessary to have recourse to a more rational agrarian policy.

Land-reclamation schemes. — The real reason which led towards the conversion of estates consisted in the necessity to press the intensification of cultivation to a maximum in order to produce enough food for the growing needs of the nation. This explains the widespread action undertaken by the Government as regards comprehensive schemes of land-reclamation ⁽¹⁾. The law promulgated on December 24, 1928, containing the programme of comprehensive land-reclamation, which filled all the gaps in the previous legislation, also solved the various problems which had up till then been judged insoluble or left in suspense: drinking water supplies, construction of roads essential for the intensification of agriculture, construction of rural towns and centres, of farm buildings, etc. Provision was made in particular for financing numerous measures relating to the various land-reclamation schemes. The whole plan of operations as drafted in the law involved a total outlay of about 7,000 million liras, including 4,500 millions for hydraulic reclamation and subsidiary work and 2,500 millions for irrigation and the construction of villages, farms, aqueducts and country roads. This law was later completed by the Serpieri law of February 13, 1933, co-ordinating and codifying the land-reclamation measures in force ⁽²⁾.

Under the terms of this latter law, 77,000 hectares of land in the Pontine Marshes were reclaimed. Formerly this area had a population of a few hundred men, and that only during the summer months; they sheltered in miserable huts, exposed to the most virulent forms of malaria. Today several towns flourish in the area (Littoria, Sabaudia, Pontinia, Aprilia, Pomezia), and 17 rural centres have been built. The land is dotted over with settlers' homes (3,147) and farms (2,574), the population amounting to 60,000 workers and settlers.

The success of settlement as a means for establishing peasants on the land is proved by the magnificent results obtained by the schemes of comprehensive land-reclamation, which had been carried out over an area of 5,700,013 hectares by July 1, 1938. All the results of this tremendous activity are not yet apparent since much of the work executed has merely created the preliminary conditions which will make it possible to attain more important objectives.

For various reasons, however, land-reclamation has not been carried out in Sicily on such an extensive scale as might have been hoped from the scope of Government action. While the total area of the *latifundia* is 728,588 hectares, on July 1, 1938, hardly any land reclamation work had been started on an area of 515,115 hectares. At that time several works of a public character, such

⁽¹⁾ TASSINARI, Prof. G.: *La bonifica integrale nel decennale della legge Mussolini*. Bologna, 1939.

⁽²⁾ COSTANZO G.: *Land reclamation and improvement in Europe*. Documentation for the European Conference on Rural Life. International Institute of Agriculture. Rome, 1939.

as the laying out of irrigation canals, the construction of bridges and roads, etc., were in course of execution over an area of 123,667 hectares. Public works had been completed over an area of 37,149 hectares, and others, to be carried out by private initiative, were about to be started. Public works and those belonging to the category of agrarian transformation had been completed over an area of only 52,657 hectares (7 per cent. of the total area). (1).

It is true that from the standpoint of private economy the early years are of course the most difficult when carrying out agrarian transformation. Sums invested in these works are relatively large, and only a very small part, if any, can be paid off during these first years, while the economic returns from the transformation do not begin to come in till much later, when a certain degree of balance has been reached between the income and the expenses of the farm.

But looking at the matter from the standpoint of collective interest, the final goal of land-reclamation is the creation of the agricultural and economic conditions essential to an increased national output and to the establishment of the peasants on their native soil. The State cannot allow the private interests of the large landowners to be decisive unless they are sufficiently in harmony with the interests of the community.

This is the principle which has inspired the recent agrarian policy adopted by Italy in Sicily and known as the "attack on the *latifundia*".

Methods of settlement. — The general scheme of the work of transformation of *latifundia* presents itself as follows. When comprehensive land-reclamation has improved the soil for agriculture from the technical standpoint, the large landowner, in his turn, effects a radical transformation of his land, in accordance with the principles of agrarian economy, establishing throughout his whole estate numbers of small holdings and building houses for the peasants. This work of transformation of his estate is compulsory for the landowner. The law of January 2, 1940, on the settlement of the *latifundia* in explicit on this point:

"The owners of land in the areas of Sicily where the economic system of the *latifundia* is in force, are obliged, even if their land is situated outside the districts (*comprendori*) declared subject to reclamation, to begin the settlement of their estates by creating economic farm units (*unità poderali*), and establishing thereon the families of farm workers in accordance with the directions of the Ministry of Agriculture and Forests, in the manner and on the conditions fixed by the said Ministry. They must moreover adopt suitable technical methods of management of their estates and introduce the new stable conditions of labour which will contribute to the improvement of the land by guaranteeing an equitable remuneration to the farmer who undertakes the improvement".

If the owner in question has not sufficient financial means to carry out the work of transforming his estate, a public institution established by the Government for the purpose, under the title of *Ente di Colonizzazione del Latifondo Siciliano*, will come to his assistance and advance the necessary sums. This institution has at present an appropriation of one milliard liras and its purpose is

(1) *Annuario Statistico Italiano*, 1930-XVII. Istituto Centrale di Statistica del Regno d'Italia. Rome, p. 85.

to provide technical and financial aid to landowners in the work of transformation and productive organization; if necessary, it may proceed directly with the settlement of the land it holds either as permanent property or in temporary possession.

The following property is under the management of the Institution:

(a) State property of which the Institution requests the cession on emphyteusis, or on long lease, when it answers the purposes of settlement; as well as property consisting of the *trazzere* (old cattledrives used for the passage of livestock), which may be assigned to the ownership of the Institution;

(b) Real property belonging to the communes, to public welfare and charitable institutions and other legally recognised institutions; and property which has been assigned to the Institution either in full ownership or in possession.

(c) Real property belonging to private individuals which has been voluntarily alienated, granted on lease or otherwise transferred by the proprietor himself, for the purpose of transformation;

(d) Real property belonging to private individuals on which the Institution has been empowered to carry out reclamation, even without the consent of the owners, under the terms of the law referred to above.

If the Institution considers that the action of the proprietors is such as to compromise, by reason of delay or of lack of territorial continuity, the completion of the land-reclamation work within the fixed term, it may obtain authorization from the Ministry of Agriculture and Forests to carry out all or part of the necessary work in place of the landowner and on his account.

Moreover, the Institution may be empowered to expropriate the real property of the landowners who fail to comply with the reclamation obligations under the terms of the law of February 13, 1933, article 42 of which threatens all the landowners who fail to fulfil the conditions imposed on them, and which they have previously accepted, with expropriation, on payment of adequate compensation.

After having carried out the work with which it has been entrusted, the Institution returns the land to its owners already broken up into economic farm units and ready to receive the peasant settlers. The landowners are compelled to refund to the Institution all the expenses incurred or to compensate the latter by the grant of a definite area of land for settlement by the Institution.

At first the land so divided is leased to peasants, and does not become the property of the occupiers until after the lapse of 18 years. In this way the landowner has full rights over the estate during the transition period.

The scheme involves the creation in Sicily of a total of 20,000 rural holdings with an average area of 25 hectares. The whole cost of the plan will amount to over 2,500 million liras, of which 1,000 million liras will fall on the State, and the remaining 1,500 millions will be found by the interested parties.

The solution of the problem of the Sicilian *latifundia* is not intended as a blow against the large landowner as such, as long as he understands his personal rights over the land as implying a duty towards society and the rational management of his estate. The State merely tries to induce him to collaborate actively in this important undertaking.

The transformation of the land which is taking place may, however, on many grounds be described as a real agrarian revolution, since a very old and outworn institution has at last been despoiled of the last vestiges of feudalism

and will in the future fulfil the social functions of up-to-date agriculture, blending harmoniously in modern economic life.

The same principle of conversion of the large agricultural estates into a series of small holdings is being applied at present in continental Italy, where in the whole area of the Apulian Tavoliere, comprising 438,000 hectares, a comprehensive scheme of agrarian transformation was planned, and where the establishment of new peasant holdings has already made considerable progress in certain parts of the region. Before very long the Calabrian *latifundia* will also enter into the general settlement scheme.

Distribution of farms.— Under the influence of the factors which have made it possible for the peasants to develop their activities, the distribution of farms, in Italy, as shown by the first agricultural census taken in 1930, was as follows.

TABLE XI.— *Number and Area of Farms and their Distribution according to total Area.*

| Total area of holdings | Farms | | Total area of farms | |
|----------------------------|-----------|-------|---------------------|-------|
| | Number | % | hectares | % |
| Under 3 hectares | 2,763,671 | 65.8 | 3,043,702 | 11.6 |
| 3 to 10 " | 1,025,036 | 24.4 | 5,571,107 | 21.3 |
| 10 " 20 " | 253,959 | 6.1 | 3,535,864 | 13.5 |
| 20 " 100 " | 132,536 | 3.1 | 4,970,718 | 18.9 |
| Over 100 " | 21,064 | 0.6 | 9,120,903 | 34.7 |
| Total | 4,196,266 | 100.0 | 26,251,744 | 100.0 |

A study of the above table shows in the first place that there is a large number of small holdings under 3 hectares in area which do not provide the peasant with a livelihood except in certain areas where agriculture is very intensive. There are 2,763,671 of these farms, or 65.8 per cent. of the total number, covering about 11.6 per cent. of the total area. They play a very important part in Italy. This situation is probably due in part to the equal division of landed property between heirs, there being no law of primogeniture in the old Italian Civil Code, as we have had occasion to point out, to protect small holdings against being broken up on succession.

Small holdings between 3 and 10 hectares are also very common. They represent almost one quarter of the total number of farms, and more than one-fifth of the total area.

The third group, consisting of medium-sized farms with an area varying between 10 and 20 hectares, includes 253,959 farms (6.1 per cent.) with an area of 3,535,864 hectares (13.5 per cent.). The farms in this group, which have a higher power of economic resistance, are to be met with chiefly in Piedmont, Lombardy, Venetia, Emilia, Tuscany, the Marches and Sicily.

The number of large farms measuring from 20 to 100 hectares is very small, namely, 132,536, or 3.1 per cent. of the total; but their area amounts to 4,970,718 hectares, or 18.9 per cent. of the total area.

Finally, the last series of farms, in which we have grouped the large estates with an area exceeding 100 hectares, consists of 21,064 farms, *i. e.*, scarcely more than 0.5 per cent. of the total, although they cover an area of 9,126,963 hectares, or more than one third of the total area (34.7 per cent.). Most of these farms are found in Piedmont, Lombardy, Venetia, Tuscany, Latium, Calabria, Sicily and Sardinia.

The second farm census which is to form part of the second world agricultural census, will probably throw light on the new agrarian structure in Italy and on the conversion of the Sicilian *latifundia*. It will also show how a change in the migratory movement and a decline in international trade, due to autarchic tendencies, have contributed towards the re-orientation of Italian agriculture and a new distribution of landed property.

(to be continued)

M. TCHERKINSKY

SOME OBSERVATIONS CONCERNING THE STATISTICS OF THE PRODUCTION AND CONSUMPTION OF FODDER

SUMMARY: *Introduction*. 1. The progress of agricultural statistics and its present-day trends - 2. Characteristics of the organization for the production of fodder and its importance for agriculture - 3. Various problems of fodder statistics and the present state of research - 4. The importance of fodder statistics for international agricultural trade and for the organization of agriculture. — *Statistics of fodder production, their present condition and their need for improvement* - 5. Statistics of area of fodder crops (on arable land, meadows and pasturage) - 6. Statistics of the volume of various fodder crops. — *Statistics of fodder consumption as a basis for research* - 7. number of livestock as a basis for estimating requirements of feeding stuffs - 8. Control of fodder consumption. — *Conclusions*.

Introduction.

1. — The modern tendencies towards planned economy and in some cases towards more or less complete autarchy, which began to make themselves felt immediately after the Great War, have led to a considerable improvement in statistical research in every sector of economic activity. The purpose of statistical research in this field was to throw more light on the various aspects of economic activity in the different countries. A comparison of the statistical data concerning the various branches of present-day economy with similar figures for the period immediately following the Great War, shows that, from the three-fold standpoint of extent, contents and accuracy, there has been an uninterrupted improvement. It is being increasingly recognized that the structure and working of agriculture are directly dependent upon local and individual conditions, and economists are devoting more and more attention to the study of regional statistics, as well as to that of statistics for the different specialized branches of agriculture and to the analytical study of the technical and economic position of isolated units, *i. e.* of particular farms (¹). It would be impossible

(¹) SEDLMAYR: Die landwirtschaftliche Betriebsstatistik. Anleitung zur Einrichtung der Wirtschaftsstatistik landwirtschaftlicher Betriebe, Berlin, P. Parey, 1925. — FENSCH, H.: Betriebsstatistik. In: Archiv des deutschen Landwirtschaftsrats. 45; 1927, 301-322; 46, 1938, 154; 471, 1939, 411-506.

to exaggerate the importance of these detailed investigations for the study of the statistics and the dynamics of rural economy.

It will readily be understood that the progress of statistical research described above, which is intimately connected with the far-reaching transformation taking place in agriculture throughout the world, has not yet reached its full development, and that statistical studies are hampered by the inadequacy of data which must be made good. In spite of the progress made in recent years, agricultural statistics have not reached the same degree of development in all countries and, their results are not sufficiently uniform to permit of international comparisons.

In the present article we will deal briefly with one of the most important branches of agricultural statistics, whose importance, however, has only been recognized during the past few years, namely, the statistics of production and consumption of fodder. This branch, is perhaps one of the latest additions to agricultural statistics; its aim is to establish, with increasing accuracy, the relations existing between the production, importation and consumption of all feeding stuffs used in animal husbandry. In the case of a particular farm, as well as in agriculture as a whole in certain countries, this relationship determines the organization, extent and capacity of animal husbandry. The ratio in a given country between homeproduced fodder and the volume of imported fodders has a decisive influence on the country's capacity to meet its needs in animal products. This capacity for meeting the requirements of consumption depends, of course, not only on the quantity, but also on the quality of the fodder. The increasing demand—under normal conditions—for animal products and especially those of superior quality, depends in turn of the continuous rise in the standards of life of civilized peoples. This continuous increase in consumption makes new demands on agriculture which are not easily met and which can only be filled within the limits allowed by the systems of agricultural production existing in each country. Proof of this may be found in the radical changes which have taken place in the organization of fodder crops in several countries since the Great War. In no branch of agriculture have such profound changes occurred as in that of the cultivation of plants for the feeding of animals.

2. — The organization on rational lines of fodder production in relation to the needs of animal husbandry feeding depends, of course, on many natural or economic conditions. In the first place, these conditions consist in the composition of the soil, climate, water supply, etc. These conditions differ widely, and these differences, in their turn, produce variations in relation to geographical position, in the character of the fodder output, the choice of plants, their nutritive qualities, the rotation and the disposal of crops, etc. These conditions taken as a whole also affect the structure and evolution of production and are a decisive factor in determining its extent and intensity. In the second place, the organization of fodder cultivation and animal husbandry is also determined by a series of conditions called economic, such as the conditions of marketing, labour, transport, social conditions, organization of trade, etc. In contrast to natural conditions, which can mostly be considered as invariable, the character of the economic conditions depends on the general economic progress of a given coun-

try; it is consequently more or less variable. The organization of the fodder output in each country is therefore the result of a combination of all these factors and reflects the changes to which they are subject.

3. — The aim of the present article is to make a brief study of the possibilities of a more thorough statistical inquiry into the production and consumption of fodder. There are on the whole three special branches of statistical research whose study should be improved or even reorganized. *In the first place*, it is essential that a systematic improvement be made in the study of *fodder production* in the various countries. In this case we should deal in the first instance with the statistics concerning the total area devoted to fodder crops and the areas cultivated to the various plants used for forage, and the statistics of the quantities produced. Another branch, belonging to the same category, which might be very useful for completing figures concerning fodder production, is the study of the various fodder crops from the qualitative standpoint; in this case it would be necessary to establish the actual food value of the substances harvested for use as fodder. Indeed, it is not enough to know how many quintals of hay have been produced; what is necessary is to have a definite knowledge of the quality of the hay crop as determined by its content of nutritive substances, which differs in the various qualities of hay.

In the second place, statistics similar to those prepared for the study of human nutrition should be compiled concerning the effective demand and the actual consumption of the different varieties of fodder. Statistical research in this field should be based not only on the statistical study of the head of livestock and the theoretical requirement of feeding stuffs, but should start from concrete figures on actual *fodder consumption* and, at the same time, in so far as possible, on the content of nutritive substances in the various fodders. This branch of agricultural statistics, although of such recent date and practiced only in a few countries, is not only essential for compiling a fodder balance in the various countries, but also for solving certain problems relating to international trade in fodder. Without such statistics it would be impossible to find out in what measure the fodder output meets requirements in the various countries or to ascertain the shortage or surplus registered in the case of each crop; in short, the object is to collect all the necessary information concerning the conditions and trend of the trade in these particular products. It goes without saying that the compilation and study of these figures would involve a great expense of time and work if satisfactory results are to be obtained. Lastly, *in the third place*, we have to consider the statistics of international trade in feeding stuffs as compiled at the present time. All that would be required would be to complete these figures with more detailed information concerning the amount of nutritive substances contained in the various fodders. This subject will be dealt with below.

4. — These are the broad lines of the main conditions essential to the organization of fodder statistics. As has already been stated, this is not a matter of establishing new branches of statistics, but rather of completing work now in progress, of obtaining new material in the different countries on the basis of a uniform plan and, lastly, of analysing the results. This is not a new subject; but up to the present the attempts to establish a fodder balance and to plan

the fodder supplies necessary for farms have been confined to the field of rural economy. The new aspect of the question lies in the fact that this problem has grown in importance as a result of the economic developments of the past few years largely influenced by the modern trend towards autarchy. Consequently, what has to be done today is to solve the same problem on general or national lines, making the necessary improvements in the statistics of production, consumption and trade.

The importance of this inquiry is mainly of a practical nature. By completing the statistical data on fodder production and crops, and on exports and imports of these products, it would be possible in the first place to improve the organization of international trade in every kind of fodder between the countries deficient in fodder and those possessing an exportable surplus. Moreover, this inquiry would be exceedingly useful for improving the organization of agriculture. With the assistance of accurate figures, it would become possible to effect a better adjustment between the volume, intensity and composition of the cultivation of fodder crops, on the one hand, and trade conditions, on the other. In this way, the fluctuations which characterize this form of agriculture and which are sometimes excessive, could be prevented or else mitigated to a certain extent. It is a well-known fact that the area devoted to fodder crops, as well as the quantity harvested, are subject to much more severe fluctuations, from one year to another than those of other crops, such as, for instance, cereals, root crops, industrial plants, etc.

Moreover, good statistics would also provide a much more trustworthy basis for the organization of animal husbandry and ensure greater stability in the production of fodder. Should such statistics be available, it would also be possible to reduce the fluctuations in livestock caused by the abundance or shortage of fodders, which are sometimes extremely harmful. Greater stability in the fodder output would of course also contribute towards the stabilization of the sale prices of livestock. Briefly, the second and chief objective for making this inquiry would be to guarantee a more efficient organization of a sector of the agricultural industry which has been exposed, especially during the last period of depression, to violent dislocation.

Statistics of the production of fodder.

What then are the present conditions and the future prospects for a systematic organization of research in this field? As has already been said, the solution of the various problems involved may only be attained by stages and will require the expenditure of much time. In the present article we will confine ourselves to indicating the main lines of the improvements to be made in the statistical bearing on this subject ⁽¹⁾.

(1) MÜNZIGER-HOPPE-SPERBER: Die Viehhaltung und natürliche Futtergrundlage (Berichte über Landwirtschaft). Neue Folge, 125. Sonderheft.

KLANDER: Eiweissbedarf und pflanzliche Eiweisserzeugung. Ibid. 129. Sonderheft.

WALDHÄUSEL: Die bodenständige Futterbedarfsdeckung der Rinderhaltung. Ibid. 129. Sonderheft.

KEISER: Futtergrundlagen der deutschen Viehhaltung und Möglichkeiten des Ersatzes von roh u. veredelt eingeführten Futtermitteln. In: Die Deutsche Landwirtschaft 4, Berlin, 1932.

SMYERS: «L'alimentation rationnelle du bétail laitier à l'aide des fourrages produits à la ferme». (Actes du XI^e Congrès International de Laiterie, Berlin 1937. Vol. I).

5. — The first thing to be done is to complete the figures concerning the areas used in the production of fodder. In spite of the progress made, it should be observed in this connection that the statistics for the various countries are still incomplete and present considerable differences so that they should be completed and rendered more uniform. The chief differences consist in the methods of classification adopted for the various fodder crops in the different countries since these methods lack the uniformity essential for making them comparable. A few instances will suffice to make this clear: in some countries the area sown to the various *fodder crops on arable land* is given only as a total, without any details. It is therefore only possible to make comparisons which are so generalized as to exclude all possibility of drawing any sort of balance. In other countries the statistics concerning the use of cultivated areas supply no information as to the extent of arable land, meadows or pastures occupied by fodder crops, giving only the areas used for the classification of the areas under root crops—whether used entirely or only in part for feeding purposes—is not sufficiently clear to permit any estimate to be made of their importance from the point of view of fodder supply. This is the case, for instance, for potatoes which are used for both human food and animal feeding, as well as for industrial purposes. The same applies to sugar beets, oats, barley and some other crops. To obtain a true picture of the areas under fodder crops, it would be necessary to indicate, at least approximately, in the case of all the crops used for two or more purposes, the total area utilized for each separate purpose.

In this connection mention should also be made of the need for improving the statistics concerning what are termed intercalary crops, i. e., those grown during two consecutive years between two other main crops. The statistical assessment of the area sown to these crops, which have been steadily gaining ground and which are of considerable importance for the feeding of livestock, also encounters difficulties due to the short period of their growth.

As in the case of fodder crops grown on arable land and included in the various rotations, statistics for natural meadows and pastures in many countries are incomplete. In most countries, the area under meadows and pastures, which often constitute the main basis of the fodder output (in Germany, for instance, they represent 42.4 per cent. of the fodder producing area), is not recorded statistically with sufficient accuracy and regularity. In some countries, statistics only show the total area devoted to the two crops under consideration; in others, they include even the forest area, while in others again no data at all are available. But even in cases where the area of the meadows and pastures is given most accurately, the differences in the methods of classification and the lack of a sufficiently clear and uniform terminology make any comparison impossible. It is true that the characteristics of these two types of fodder crops, their intensity, the quality of fodder produced, the period of growth, etc. show wide differences, but this does not exclude the possibility of considerable improvements in their statistical registration.

Another source of difficulty in this field is the irregularity with which statistics are compiled in the various countries, no system existing which would ensure the compilation of figures at regular intervals of one or several years. If it were possible to follow the changes which take place during a given period in the use

of areas reserved for fodder crops, it would be much easier to assess the trends of the fodder production more accurately in both its quantitative and its qualitative aspects.

6. — Many improvements are necessary, too, in the statistics concerning fodder crops harvested. While those for other plants grown supply adequate and detailed information, those for fodder crops are, for the most part, restricted to vague or approximate estimates. Sufficient information on this subject is available only for fodder cereals or perhaps for some of the root crops whose yields form the object of more continuous and systematic statistical research. As a rule, however, the data and estimates concerning the yield of most of the crops to be used as fodder are not adequate for the compilation of a sufficiently accurate and detailed balance. Concerning coarse fodder (roughage according to American use) which forms the real basis of livestock feeding and on which as a rule animal husbandry mostly depends, practically no statistics have been collected, except in very few cases, and that for scientific rather than for practical purposes. This applies, for instance, to the assessment of the hay crop. Most of the statistics in the various countries have been restricted so far to very approximate estimates of the yield of hay per unit of area, sometimes even without taking any account of the quality, which is in some cases very important. This procedure, sometimes based on extremely approximate estimates, gives only a very incomplete idea of the situation. In the first place, no indication is given of the quality of the hay, or of its content of nutritive substances. Even although the content of nutritive substances of all coarse fodders—not only of hay—varies very considerably, and in any case much more so than in concentrated feeds (fodder grains, oilcakes, etc.), the indication of the quality of the hay would constitute an important advance. Consequently, crop data which take account of the weight alone, without any mention of the quality, are of absolutely no use for calculating the food value, or giving a true picture of the production of fodder. Countless analyses and numerous biotechnological experiments made during the past years have proved the degree to which animal nutrition and the composition of the animal diet depend upon the content of nutritive substances in coarse fodders. It should also be recalled, moreover, that this content determines the need of concentrated feeds required to complete the diet and their consumption.

It is true that it may be objected that an accurate analysis of the composition of the various types of fodder, necessary for finding out their nutritive value, involves a tremendous amount of difficult work, and that the results would not perhaps justify the efforts made. It is also undoubtedly true that it would take a very long time to accomplish the work of ascertaining the quality of the different varieties of fodder. The present progress of rural economy, however, which is tending towards an increasingly accurate study of all branches of farming, could not in the future do without a systematic knowledge of the composition of fodders, and this knowledge could be used for statistical purposes as well. The difficulties in the way are certainly not insurmountable. The important point is to organize analytical research in such a way as to take due account of the conditions ruling in the various countries as regards fodder crops and to

make it possible to form an idea of their value. To render this work simpler it would be necessary, owing to the great variety of fodder crops, to select in each country several regions where the fodder crops are more or less homogeneous in character and to use these regions in order to determine empirically—by means of tests—the quantity and nutritive value of the crops. The more detailed and accurate the division of a country into fodder-producing regions, the greater the possibility of obtaining typical and comparable results.

Of course, looking at the subject from the point of view of international statistics, any research work concerning the nutritive value of fodders produced and consumed in a country should be carried out according to a uniform system. The methods adopted in the various countries for analysis and assessment, as well as their theoretical bases, are not the same, however. In Germany, for instance, and in several other countries, Köllner's methods and units are used, while the nutritive value of foods and the effect obtained by using them for animals are expressed in feculent units; their content in albuminoids or digestible proteins is also indicated. In the northern countries and Italy, the Möllgard method is used and the value is expressed in food units, while in America the Armsby method is used. These methods correspond to the different practical methods of feeding, and depend also on the kind of livestock to which they are applied (milk cows, store cattle, pigs for meat or fat, etc.). All these methods, more or less justified, are based, however, on the same physiological considerations and are supported by practical experiments of a similar nature; they are used to express the value of a given foodstuff in relation to the effect obtained when consumed in the form of fodder. In order to lay the foundations of international fodder statistics, it is therefore essential to begin by standardizing all these methods of assessment; especially as regards coarse non-commercial fodders, or at least to establish the rules by which the various units could be reduced to comparable terms. This is perhaps the most essential part of the work. As long as the methods referred to have not been standardized, there will be no basis for statistical comparison admitting of the study of the fodder economy of the various countries; it will also be impossible to have a more accurate knowledge of the international fodder trade.

Statistics concerning the consumption of fodder.

So far we have attempted to give a brief sketch of present conditions as regards fodder statistics and to indicate some ways in which improvement may be made. We have dealt with the subject from the standpoint of production without, however, taking account of the other aspect of the problem under review, *i. e.*, actual demand and consumption of fodders. Production statistics can, however, only be satisfactorily interpreted if the consumption is known, because, while on the one hand the fodder output determines the characteristics and progress of animal husbandry, on the other, the latter has a far-reaching influence upon the fodder production. In other words, besides the changes which take place with the lapse of time, one must also know the factors which govern the *volume* of the consumption of the various fodders by livestock. As well as the total volume of consumption, we must also know—as in the case of output—

the quantity and composition of nutritive substances properly so-called consumed by the animals during a given period. Only by using these elements as a basis, as has already been said in the case of fodder production, is it possible to strike a balance between output and consumption.

Here it should be stated that statistics now available do not contain the necessary informations. In spite of the very marked progress made in the exact scientific study of animal nutrition and although it has been possible to establish definite nutrition norms for the various animals, statistics take no account of the progress made. It is true that in rural economy and farm management use has already been made for a long time of the theoretic bases mentioned above for estimating fodder requirements, but up to the present they have scarcely been used at all for the preparation of a balance on a larger scale, i. e. for agricultural regions or for whole countries. Only during the past few years of depression, and as a result of poor harvests, has an attempt been made to make deeper investigations into the total requirements of feeding stuffs necessary for livestock and into the output of certain other products. Generally speaking however, the results of all these isolated efforts have not led to any improvement in the precision of the statistical data.

7. — In order to organize statistics concerning fodder *requirements* it would be first of all necessary, to complete the existing statistics of the various kinds of livestock and to standardize the methods of registration in various countries. The results of statistical registration are at present very different, the classification of animals according to age and use not being always the same; there are also differences due to the fact that the registration is not made at the same time and is not repeated at similar intervals in the different countries. As regards these differences in statistical registration absolute standardization is of course not required, but an approximate similarity is necessary and would be sufficient to enable statisticians to determine the average composition of the herds of various kinds of livestock. By determining this *average* composition of all the livestock in all the various producing regions and throughout the whole territory of a country at the moment of registration, the work of calculating the fodder requirements of the country and the comparison between the different countries would be greatly simplified.

It would be much simpler to calculate fodder requirements on the basis of such statistics. For this purpose one of *two methods* could be adopted alternatively: either starting from the theoretical requirement of feeding stuffs, i. e., from the dietary rules used for the different kinds of animals, taking account of the objects pursued, or else, estimating this requirement on the basis of actual consumption of every kind of fodder actually fed to livestock. Each of these two methods has certain advantages and they could be satisfactorily combined. They have in fact, been used for a long time now, especially the former method, for determining the fodder balance of particular farms.

When applying the former method, it is presumed that the individual consumption of nutritive substances contained in the different kinds of fodder used actually corresponds to definite dietary rules. In reality, however, the feeding of animals differs in several respects from this theoretical basis. The selection

and use of fodders varies in relation to the practical possibilities and conditions, such as good or bad harvest, existing supplies of fodder, current market prices of fodder, etc. The practical organization of animal feeding must also be regarded rather as a matter of habit than as a question of exact calculation. It varies widely according to the degree of intensity of feeding and according to the purpose for which the animals are being raised. Consequently the results obtained by this method can never offer more than an approximate picture which does not show the many differences encountered in practice. All these reserves, however, together with those due to the infinite variety of economic conditions, in no way reduce the importance of this method and the possibilities of its application.

In the particular field of statistical study now under review and as a basis for the organization of fodder statistics, the results obtained with the method described could be of considerable importance, especially at the outset. On the basis of these results it would be possible to form an opinion—however approximate—concerning the general structure of fodder consumption in the various countries. Later, after the lapse of a few years, it would even be possible to study the nature of its fluctuations.

As regards the practical application of this method, it would only be necessary, in order to simplify comparison between the various countries, to establish a common basis of calculation for expressing the quantities of fodder required by each of the several categories of livestock. It has already been observed, when speaking of the fodder value of feeding stuffs, that the methods adopted for expressing this value differ from one country to another and according to the various authors. But both the physiological bases of nutrition and some of the essential groups of nutritive substances which compose the dietary remain the same. From the standpoint of estimating the dietary requirement *three* groups only call for consideration: carbohydrates and fat, digestible albuminoids and proteins. All the biotechnological methods express the content of fodders in these three components in an even simpler manner by reducing them to one or two common denominators. It would therefore only be necessary to select common or comparable units for every country and estimate the supposed requirements of the various animals by the same process.

8. — Lastly, only a few words need now be said as regards the *second method* mentioned above, by which the fodder requirements are estimated by reference to actual consumption, i. e., by making individual inquiries on representative farms. This method presupposes uninterrupted fodder control and the regular weighing of the feeding stuffs given to every kind of livestock. In order to follow all the changes and variations which occur in the course of the year, the fodder must be weighed at fairly short intervals (once a fortnight or at least once a month). For greater clarity concerning the calculation of the quantitative consumption of fodder by the livestock, certain fodder categories should be established taking due account of the content of nutritive substances and the physical constitution of the fodder (coarse green or dry fodders, coarse ensilage, fodder grains, commercial concentrated feeds, waste products from the dairying industry, etc.).

It goes without saying that individual control of this description, which involves much time and work, cannot be carried out except on a fairly restricted number of farms and that it is consequently better suited for special research work than for a systematic statistical service. In spite of these difficulties, however, this type of inquiry might be of considerable importance even for statistical work on a large scale, such as that described in this article. Detailed data concerning the organization of feeding stuffs obtained by this method would be very useful for the compilation of the table of results estimated on the basis of theoretic dietary requirements. Above all, they would throw light on the structure of consumption and distribution of the various fodders—coarse and concentrated—in the balance of a given producing region or country, and this would be extremely valuable for purposes of comparison.

Conclusions.

The requirements of modern agriculture, which tend increasingly to enhance the importance of animal production, have obliged scientists to make an exhaustive study of all the problems affecting fodder production and consumption. These studies, which embrace the economic and technical aspects of the problems raised, have been carried to a high degree of perfection. Rural economy, in particular, has supplied a huge amount of monographic material for certain countries, and has given us an idea of the actual production, requirements and consumption of fodders on individual farms and in particular regions. In certain countries, as for instance in Germany, studies have also been carried out concerning production of certain essential feeding stuffs throughout the whole country or in extensive regions. On the other hand, general agricultural statistics have so far offered only scanty information concerning fodder production, consumption and trade; these figures are not sufficient to allow students of rural economy to establish fodder balances in the various countries, to ascertain the present situation nor yet to estimate what prospects the future offers in this field.

Nevertheless, it appears that it would be neither impossible nor too ambitious, to contemplate efficient collaboration between the statistical offices of the different countries, on the one hand, and students of rural economy and animal husbandry, on the other, leading to the establishment of more detailed and accurate fodder statistics than those at present available. Indeed, only through close collaboration between the various branches of activity will it be possible to fill the need for sufficiently complete and accurate fodder statistics. In countries where monographic studies concerning the production and consumption of fodder have not yet been made, and where the nutritive value of the fodder output in the various regions has not yet been studied, work of this description should be carried out by economists and technicians; the results of these studies would help in the classification of fodders and in establishing the limits of nutritive content in each case, thus contributing towards making statistics more complete. Recourse will have to be had to the method of sampling, which, starting from local monographic studies, would provide a valuable means for forming an idea about the situation in the country as a whole. The local and national offices could adopt the systems of classification thus established for collecting and compiling their statistics. It goes without saying that only

when national statistics have made sufficient progress will it be possible to include them in international figures, such as the *Yearbook* published by the Institute. The International Institute of Agriculture should, however, take an active interest in the efforts made in this direction, from the outset, since one of its tasks should be to ensure that the work of the national statistical offices is carried out with sufficient uniformity to permit its results to be used for international purposes.

J. ZLÁMAL.

BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS

SCHUMPETER, Joseph A. *Business Cycles*. A Theoretical, Historical and Statistical Analysis of the Capitalist Process. McGraw-Hill Publishing Company Inc., New York and London, 1939. 2 volumes. XVII, 1005 pp.

In the two volumes under review Professor Schumpeter shares with his readers the accumulated results of nearly 30 years of investigations in the problem of economic fluctuations, a field in which he has long been one of the leading workers. It is therefore no exaggeration to say that his ponderous contribution to the literature of the business cycle represents a landmark in the history of research in this problem.

Professor Schumpeter's comprehensive view of the business cycle is clearly indicated in the sub-title of his treatise. In the opening lines of his Preface he stresses it by saying that "analysing business cycles means neither more nor less than analysing the economic process of the capitalist era". This puts the problem in a historical setting and suggests the methodological approach to its study. "Since what we are trying to understand, we read in another part of the book, is economic change in historic time, there is little exaggeration in saying that the ultimate goal is simply a reasoned (... conceptually clarified) history, not of crises only, nor of cycles or waves, but of the economic process in all its aspects and bearing to which theory merely supplies some tools and schemata, and statistics merely part of the material" (p. 220).

Roughly half Professor Schumpeter's book is essentially historical. It deals with the economic evolution, mainly in the United States, the United Kingdom and Germany, from 1786 to 1938, thus covering a period during which, from the early Industrial Revolution, our industrial system passed to what was designated by Werner Sombart as the epoch of High Capitalism (*Hochkapitalismus*), and finally to the present structural crisis in which new forms of social and economic organization are being evolved.

In the rest of the treatise the fundamental ideas and the working concepts of the theory of the business cycle are thoroughly expounded and analysed. Indeed, while he stresses the importance of historical research in the study of business fluctuations, Professor Schumpeter deals very thoroughly with the various aspects of the theoretical approach to the subject and with the statistical methods applied in its investigation. In the chapter on *Equilibrium and the Theoretical Norm of Economic Quantities* he advocates the old Walrasian concept of equilibrium as fundamental in the study of economic fluctuations, as distinguished from the Marshallian definition and some later notions, such as that adopted by Keynes in his "Treatise on Money"; an attitude which is exceedingly welcome, since Walrasian equilibrium, though perhaps too absolute theoretically, has the great practical merit of at least being unambiguous.

Professor Schumpeter's basic concept of "innovations", which has long been familiar to the students of the business cycle as his particular notion of the motive force behind the fluctuations in economic development, is dealt with in the chapter on *How the Economic System generates Evolution*. Innovation is defined as any "change in the methods of supplying commodities", the word "change" being interpreted in the widest possible sense. It covers the introduction of new commodities, the opening-up of new markets or new sources of supply, technological changes in production, new business organization etc., "in short, to quote the author's own words, any 'doing things differently' in the realm of economic life" (p. 84). It will be observed that this conception of the business cycle, unlike most others, definitely allows for the part played by agricultural developments in generating economic fluctuations, in so far as they produce changes in the methods of supplying essential commodities. Thus, the great extension of agricultural production in the New World, as a result of the development of steam transport, or the disappearance of Russia from the world cereal market since

the Great War and the Revolution, would naturally figure as "innovations" which would affect the cyclic evolution of the economic system. In conformity with the general trend of his reasoning, Professor Schumpeter, however, insists on keeping strictly apart, as a possible cause of "special cycles" which may superimpose themselves on the waves produced by innovations but do not generate the general cycles, such so-called "harvest cycles" as those of the Jevonses, father and son, and of Moore. "There is no theoretical presumption, he says, as to the relative importance of these special cycles. It varies obviously historically and geographically. At some times and in some countries they may dominate observed fluctuations" (pp. 178-9).

The cyclical character of economic evolution is dealt with in the chapter on the *Contours of Economic Evolution*. Here, Professor Schumpeter definitely rejects the notion of regular periodicity, still held by some eminent students of the business cycle. According to him, there is nothing "to point to periodicity in the cyclical process of economic evolution if that term is taken to mean a constant period. And there is no rhythm or cycle if we choose to define either of them with reference to periodicity in that sense" (p. 143). The duration of phases depends "on the nature of the particular innovations that carry a given cycle, the actual structure of the industrial organism that responds to them, and the financial conditions and habits prevailing in the business community in each case" (p. 143). This follows logically from the fundamental conception of the process of economic evolution. Equally logical is his insistence upon every cycle being "a historical individual and not an arbitrary unit created by the observer" (p. 156).

The reader who had followed the closely reasoned exposition so far, is led to visualise the evolution of the economic system as a succession of more or less irregular fluctuations resulting from the superposition of cyclical movements generated by innovations and of "special" cycles or waves. These various cycles or waves are neither synchronous nor similar in any other respect, and their resultant, therefore, though essentially cyclical, cannot be uniform or harmonic in the range and rhythm of its fluctuations. This, indeed, would appear to the reviewer as the most lifelike picture of economic evolution, as he has always felt that much of the superficial appearance of regularity in the business cycle has been due to the somewhat arbitrary use of statistical devices, such as moving averages etc., and to excessive concentration upon wave length as distinguished from the vertical range of fluctuations. It is, therefore, surprising to see Professor Schumpeter build his "model" of economic evolution upon the combination of three cycles of fixed length, to which he refers as Kondratieff, Juglar and Kitchin, "because the average spans by which we choose to identify the individuals belonging to each of our three classes approximately correspond to the spans of the cycles 'discovered' by these three investigators respectively" (p. 169). This proceeding can hardly be reconciled with the general trend of Professor Schumpeter's reasoning, all the more so that, a few pages further on, he says in this connection that "the logical expectation from the fundamental idea would be irregularity; for why innovations which differ so much in period of gestation and in the time it takes to absorb them into the system should always produce cycles of respectively somewhat less than 60 years, somewhat less than 10 years and somewhat less than 40 months, is indeed difficult to see" (pp. 174). To the reader it would appear that neither Professor Schumpeter's masterly theoretical analysis, nor his excellent historical outline, warrant the adoption of a "model" so essentially heterodox.

In reviewing a treatise of so vast a scope and importance, one would be tempted to go much further, were it not for reasons of space. As it is, the reviewer is forced to resist the temptation, adding only that Professor Schumpeter's observations on Time Series and their statistical treatment, and on the Price Level, including his views on the most suitable type of index numbers, deserve special attention, especially on the part of beginners in the study of business cycles. In speaking of the price level, he rejects the exaggeration - exceedingly widespread among both business men and economists - of the rôle of prices in the generation of business cycles and of their symptomatic value. According to Professor Schumpeter, "... the very definition 'the crisis is a break in prices', and still more propositions such as 'the collapse of the price system is the real cause of a depression' betray failure to realise that the cycle is a process within which all elements of the economic system interact in certain characteristic ways, and that no one element can be singled out for the rôle of prime mover" (p. 449)].

G. P.

Prof. UGO PAPI, Segretario generale dell'Istituto, Direttore responsabile.

MONTHLY BULLETIN

OF

AGRICULTURAL ECONOMICS AND SOCIOLOGY

RECENT CHANGES IN THE EUROPEAN LAND SYSTEMS AND THEIR ECONOMIC AND SOCIAL CONSEQUENCES

(continuation)

CONTENTS: *Introduction.* The importance of the land system in the social organization
I. *Transformation of the land system for the purpose of encouraging the creation of small peasant farms.* 1. Agricultural property and the farm holding. Difference between the two notions from the economic and social points of view. Examination of the statistical inquiries on agricultural landownership carried out in different countries. 2. Large and small farms in economic theory and in agricultural practice. 3. Changes in the agrarian structure of the countries of Western Europe. General observations. Land settlement in England and Wales, Scotland, Ireland, France, Germany, Italy. 4. Development of small peasant ownership in the countries of Northern Europe and in Switzerland. 5. The countries of agrarian reform. 6. Modes of farm operation in European agriculture. 7. Comparison of the agrarian structure of the countries of Western Europe.

4. -- Development of small peasant ownership in the countries of Northern Europe and in Switzerland.

Only a brief description may be given here of the second group of countries in Western and North-Western Europe, where the progress of land settlement has led to the same changes in the land system as have occurred in the former group. In these countries of very intensive agriculture peasant farming is mostly very widespread.

Belgium. -- Most of the Belgian farms with an area of less than one hectare grow market-garden crops and are of the type which seeks to exploit the soil to the utmost, having recourse to large investments of capital and employing three or even four men per hectare, as in the case, for instance, of crops grown under glass. During the last agricultural census taken on December 31, 1929, this class represented nearly three-quarters (74.2 per cent.) of all Belgian farms, or 838,883 as compared with 544,041 (65.6 per cent.) in 1905. Their numbers are still increasing rapidly.

In comparison with earlier agricultural censuses, the first of which was taken in 1846, a decrease is registered, in medium-sized and large farms namely, in farms with an area of 10 or more hectares. The decline in the number of these farms has opened the way for the multiplication of farms with an area of less than one hectare, which occupied only 6.7 per cent. of the total farm area in 1930.

In Belgium, out of every 6 farms, 4 measure less than 5 hectares, 1 measures between 5 and 10 hectares and 1 measures between 10 and 100 hectares. Thus, the small peasant farm greatly predominates. This breaking up of the land has been encouraged in part by the divided succession to landed property, because, according to an old custom, property is divided equally among all the children of a family.

The Netherlands. — The distribution of landed property in the Netherlands is not uniform because the rich marshy soil in the coastal provinces is usually divided into large estates, while the sandy and lighter soils in the East and South are mostly worked by small peasant farms.

After the Great War the Government sought to give active encouragement to the creation and enlargement of small farms. As early as April 20, 1918, a law was promulgated "permitting agricultural workers to purchase a farm with a dwelling or to rent areas of land at some distance from their homes". Under the terms of this law, the agricultural worker is given the opportunity of becoming the owner of a holding or to lease strips of land. The small holding must not cost more than 4,000 florins including the initial improvements necessary to the house and ground. The annual rent must not exceed 50 florins nor must it be much higher in proportion to that paid for larger holdings of the same quality situated in the same district.

Encouragement was also given in 1919 to the creation of workers' farms on newly broken-up land. On November 1, 1934 a special service for small farms was instituted for the purpose of rendering assistance to smallholders with advice and subsidies.

At the moment of the last agricultural census in 1930, there were in the Netherlands 372,081 farms covering a total area of 2,150,403 hectares, the average area being 5.8 hectares. At that time farmers properly so-called accounted for 47 per cent. of the total number and 89.4 per cent. of the total area of farms, while the market gardeners represented 6.6 per cent. of the number of farms and 2.6 per cent. of the area. The number of farms operated by workers fell from 86,000 in 1910 to 57,000 in 1930; this type of farm represented 15.4 per cent. of the number of farms and 2 per cent. of the area. A high proportion in 1930 consisted of farms operated as an auxiliary occupation by persons who were not actually farmers; they represented 31 per cent. of the total number of farms and 6 per cent. of the surface. Compared with 1921 their number appears to have increased slightly, but accurate data on the subject are not available.

Denmark. — Industry on a large scale began to develop in that country about 1880 leading to a very marked flight from the land, while at the same time emigration also increased. A shortage of labour began to threaten, just when it was most needed, as a result of the reorientation of agriculture towards dairying determined by the European agricultural crisis. It was therefore decided to encourage the development of workers farms as a possible remedy.

The first law on the creation of allotments for farm workers was promulgated in 1899. While the communes were obliged to provide land for the purpose,

the state granted loans on easy terms, partly free from interest, in order to promote the creation of these small holdings. ⁽¹⁾ It was the intention of the legislator that workers who had become settled on the land through the lease of houses and of arable land or the purchase of holdings, should supply the necessary labour for work on the large farms. They would therefore have two sources of livelihood: as small farmers they could obtain their income from their small holdings and as farm labourers earn a wage from the large landowners.

Under the law of 1899 allotments were to be not under one hectare and not over 4 hectares in area. Subsequent legislation at the outset, however, greatly increased the size of these farms, so that, while they were merely workers' garden they have now become farms capable of occupying and feeding the small farmer's whole family.

Loans were granted by the State for the purchase of land on the security of a first mortgage on the farm. According to the law of May 14, 1934, the maximum amount of credit allowed for the creation of a farm is 16,500 crowns, representing as a rule nine-tenths of the purchase value of the farm. During the years between 1900 and 1937, the sum of 174.1 million crowns was granted in the form of State loans for the creation of 16,428 new farms.

In 1919 it became possible to increase the number of small farms considerably as a result of the promulgation of the law on the dissolution of fideicommissa and other forms of legally bound landed property, in exchange for payment to the State by the owners of a sum equivalent to between 25 and 30 per cent. of the value of the property and the cession, against compensation, of one-third of their land for settlement purposes. In this way, more than 20,000 hectares of land and some 100 million crowns obtained from the payments made by owners of the abolished fideicommissa became available for settlement. New farmers taking over the farms created on these estates do not pay the full purchase price to the Government, but only make annual payments based on the value of the land as estimated during the periodic assessments of all estates in the country made in connection with the payment of the land tax. Farms have thus been created which do not become the property of the settlers through this form of payment until after the lapse of a certain period.

A law dated May 25, 1933, concerning the rate of interest to be paid by small farmers who have been granted State loans, allows them a free choice between the annual payment of a fixed rate of interest on the capital invested by the State in their farms and the payment of interest at a rate which varies according to circumstances, the annual amount being fixed on the basis of the prices of butter, pig meat and barley. Under the land law of 1919, 5,672 small agricultural workers' farms covering an area of 43,800 hectares were created during the period between 1920 and 1937. The 20,190 small agricultural workers' farms created by the State between 1899 and 1937 represent about 10 per cent. of the total number of Danish farms. At the time of the agricultural census of 1933,

(1) MANNICHE, Peter: Denmark a social laboratory, Copenhagen, 1939, p. 24.

there were in Denmark altogether 204,231 farms with an agricultural area of 3,176,000 hectares.

The importance of medium sized farms in agriculture may clearly be understood from the fact that 545.9 per cent. of the farms (93,758 in absolute figures) measure between 10 and 60 hectares and cover 67.8 per cent. of the total agricultural area in the country.

Besides these medium-sized peasant farms there are 105,677 small farm workers' holdings with an area varying between 0.55 and 10 hectares. These are the most numerous, and cover a total area of 524,000 hectares. About 50 years ago, farms of this size could not have survived. Today, the rational methods of operation in use on medium-sized peasant farms are employed on these small farms as well. The modern systems adopted in Danish farming and the organization of co-operative associations throughout the agricultural industry have made the existence of this new group of independent farmers possible.

Norway. — The small extent of arable land in Norway, representing only 3.2 per cent. of the total area of the country, the fact that they are broken up into narrow strips which are often separated by huge or even insurmountable obstacles, are the natural causes which make Norway particularly unsuited for large farming.

In order to promote the creation of small farms offering their operators a subsidiary income, the Norske Arbeiderbruk- og Boligbank was founded in 1903. In 1917 its name was changed to Norske Stats Smaabruk- og Boligbank. This Bank grants loans at a low rate of interest for the encouragement of settlement. Between 1917 and 1936 the Bank granted loans amounting to 125.4 million crowns and created 18,000 new small holdings. About 550 million crowns, 121 million of which were provided by the State, were, spent by the Bank between 1918 and 1938 for buildings and settlement on uncultivated ground with an area of 141,000 hectares and for the drainage of 58,000 hectares of cultivated land.

Since 1921, either the Government itself or State-aided settlement societies have undertaken the formation of independent farms capable of supplying all the requirements of a peasant family. By 1936, 11,310 farms of this type had been created with an average area of 16 hectares.

According to the last farm census taken in 1929, there were 298,360 farms in Norway with an agricultural area of 1,578,075 hectares and an average area of 5.3 hectares per farm. Farms measuring between 0.2 and 5 hectares, which represent 80.6 per cent. of the total, are either agricultural workers' farms operated by men who engage in fishing or forest work to increase their income or else larger holdings enabling small farmers to obtain their entire livelihood.

Then come the small peasant farms measuring between 5 and 20 hectares forming 17.7 per cent. of the total number of farms. Large peasant farms with an area between 20 and 100 hectares only represent 1.73 per cent. of the total number, while the group with an area of 100 hectares or more comprises only 32 farms, their aggregate area not exceeding 0.3 per cent. of the total agricultural area.

During the twenty-two years between 1907 and 1929 the number of farms showed a considerable increase, rising from 246,634 to 298,360 ⁽¹⁾.

It is a well-known fact that forestry plays a predominant part in Norwegian economy. In fact, 24 per cent. of the whole territory of Norway (31 million hectares), consists of forests which cover 7.5 million hectares. The exploitation of about four-fifths of the forest area is carried out in conjunction with farming. Each farm has some 42 hectares of forest land, but as a rule the small holdings have little or no forest area. In Norway there still exists a very large uncultivated area suitable for growing crops; including pastures and natural meadows this area amounts to 723,577 hectares or 2.3 per cent. of the total Norwegian territory. The number of farms in Norway could therefore be increased by bringing into cultivation land which is now lying waste.

Sweden. — As a result of Government intervention many successful measures have been taken in Sweden for the encouragement of the creation of self-sufficing family farms. Under the terms of the decree promulgated on June 7, 1940, subsidies granted in the form of loans are contemplated chiefly for these family holdings (*familjejordbruk*).

The land for the creation of these holdings is mostly provided by the breaking up of large farms, in so far as this is rendered necessary by national interest, by the settlement of untitled land in Northern Sweden and by the conversion of small holdings into family farms through the incorporation of new land. Farms rented on a five-year lease renewable on the expiry of the contract are also to be created out of State lands; the lease may also be converted into ownership after the lapse of five years.

The area of these family holdings varies according to the region where they are situated, the nature of the soil, etc. The average size is about 15 hectares of arable land. The wooded area to be added to these farms should as a rule be somewhat larger, being fixed at between 19 and 25 hectares in the south, 24 and 32 hectares in central Sweden, and 55 and 74 hectares in the northern part of the country.

Under the terms of the recent law promulgated in June, 1940, the maximum capital value of the new family farms has been restricted to between 30,000 and 35,000 crowns and to 12,000 crowns for auxiliary farms (*stödjordbruk*), whose owners' main income is derived from fishing, stockbreeding, etc.

■ The beneficiary of a loan must fulfil certain conditions; among other things, he must have a small amount of capital, a good character and be capable of running the farm satisfactorily.

The application and organization of loans for family farms is to be undertaken henceforth by the State itself. Between 1905 and 1940 these loans totalled about 400 million crowns.

⁽¹⁾ STATISTIK ÅRBOK FOR NORGE, Oslo, 1939, p. 42.

Loans on family farms may amount to 90 per cent. of the value of the property to be purchased; in the case of auxiliary holdings these loans may not exceed 65 per cent. of their value. Loans granted on holdings (*arbetersmåbruk*) belonging to workers engaged in forestry, rafting, etc., may not exceed 7,000 crowns.

Besides loans granted for the creation of farms, special loans are offered in the form of bonuses amounting to between 3,000 and 4,000 crowns for each farm; these loans must be used for financing the purchase of equipment and to cover other expenses resulting from the purchase of the holding. The tenants of State lands receive loans for the purchase of livestock amounting to 4,500 crowns.

Between 1905 and 1940 some 100,000 small holdings were created in Sweden; nearly 65,000 of these are family holdings, while the remainder belong to day-labourers and consist of a house and a small patch of adjacent ground.

When the last agricultural census was taken in 1932, there were in all 669,751 farms in Sweden, covering a total area of arable land amounting to 3,724,625 hectares and with an average area for each farm of 5.6 hectares. This average increases to 30.7 hectares if the total area of the farms included in the census (20,584,079 hectares), is taken into account. Small holdings not exceeding 2 hectares in area represent more than one-half of the total number of farms, or 54 per cent., but cover only 3 per cent. of the cultivable area. Then come the small farms with an area varying between 2 and 10 hectares, in other words the farms called "incomplete family farms", representing 31.7 per cent. of the total number of farms and covering 30.5 per cent. of the arable land. The percentages of the total number and total area of these farms are therefore almost the same. Medium-sized farms between 10 and 30 hectares in area form 11.5 per cent of the total number of farms and 34.5 per cent. of the cultivable area. Lastly, large farms with an area of more than 30 hectares only represent 2.7 per cent. of the total number and 31.2 per cent. of the area of arable land. The number and area of these farms are in inverse proportion to the figures registered for small allotments of land.

The varying configuration of the land has, of course, had a great influence on the distribution of the several groups. In the plains in Southern and Central Sweden, where the density of the population is high, and where cultivation is relatively easy, most of the farms are large, or even very large. On the high plateaux in the forest region, the arable land is usually divided into small farms, while on the plateaux in Southern Sweden and in the forest and mining areas of the central area of the country, a fair number of large farms is also found. The numbers of the latter decrease, however, as one proceeds farther north.

Switzerland. — The agrarian policy pursued in Switzerland is directed mainly towards achieving a more rational configuration of holdings and towards the consolidation of scattered patches of land; the creation of new farms is less important, since the area available for this purpose is comparatively small.

It is nevertheless still possible for Switzerland to carry out settlement schemes on a limited scale, such as the settlement of the common grazing lands situated

on the Alpine spurs, the repopulation of the mountainous regions affected by the flight from the land due to excessive industrialization and the division of the large peasant estates, as in the Canton of Fribourg.

The Swiss association for settlement and industrial agriculture founded in Zürich in 1918 aims at encouraging settlement and contributing towards the full exploitation of the economic resources of Swiss soil.

During the period from 1905 to 1929, the dates of the last two farm censuses, the number of small holdings and large farms declined, while there was a simultaneous drop of over 25,000 units in the total number of farms. There was, however, an increase in the groups of medium-sized farms during the same period. The farms in the size groups ranging from 5 to 10 hectares and from 10 to 15 hectares have increased in Switzerland at the expense of small holdings measuring between 0.5 and 5 hectares and of the large farms with an area exceeding 15 hectares.

According to Prof. Howald's survey of the agrarian structure of Switzerland published in the *Handbuch der Schweizerischen Volkswirtschaft* (1939), the amalgamation of small farms in larger units takes place mostly in the neighbourhood of towns and in the districts formerly engaged in vine growing and home industries and where the pulling up of the vines and the decline of these industries has threatened the very existence of many families of day labourers and small peasants. The creation of small holdings in the Valais and the Tessin is encouraged by the intensive cultivation of the soil for special crops, such as vines, market-garden produce and fruit, as well as by the breaking-up of agricultural property.

Under the terms of the order promulgated on December 14, 1936, the Swiss Confederation subsidizes settlement, especially for the creation of farms and market gardens for the unemployed. The outlay for the creation of a farm must not, as a rule, exceed 3,000 francs and 12,000 francs in the case of small market-gardens. The funds necessary for financing settlement schemes, *i.e.*, 1,000,000 francs, are supplied by means of a credit opened by Federal decree dated June 20, 1936 concerning support of settlement schemes.

The total sum granted in subsidies for each settlement holding, two-thirds of which to be met by the canton, must not, as a general rule, exceed 40 per cent. of the cost of organizing the holding. A non-interest-bearing loan may also be granted; during the first five years the creditor may not demand the repayment of this loan if the borrower proves a good farmer. After the lapse of this period, the loan may be repaid in ten equal yearly instalments.

5. — The countries of agrarian reform.

As a result of current events in Europe, the countries where agrarian reform has been effected in Eastern and South-Eastern Europe have undergone numerous transformations. The frontiers of some of these countries have been altered; in others, the existing social and economic structure has been transformed etc. No very accurate information is as yet available concerning their present agrarian

structure and consequently we will confine ourselves in this study to glancing at this agrarian reform as a whole and summarizing the transformations which have taken place during the twenty years between 1918 and 1938.

Agrarian reforms offered one of the chief and also, in part, one of the most radical solutions to the social problem. After the period of tension experienced by the peasant classes during the Great War and after their countless sacrifices, the creation of better living conditions for the rural population became an inescapable duty for every nation. The main purpose of agrarian reform was to satisfy the peasants' traditional longing for land by helping them to acquire holdings of their own.

One of the main features of the period when agrarian reforms originated was the importance which was then attached to objectives of an essentially social nature. Economic objectives, such as the increase of agricultural output, the encouragement of exports, etc., had to yield pride of place to moral and political considerations.

Nevertheless, the war had only given the final impulse to agrarian reform. The true cause must be sought in the conditions prevailing among the peasants of these countries before the war. Generally speaking, the great majority of the farms in these countries were exceedingly small, while a few large landowners owned a considerable part of the land.

As a result of this distribution of the soil there were thousands of families of small farmers who were unable, owing to their farms being too small to employ all the members of the family. This led to seasonal or permanent emigration of surplus labour. Moreover, the concentration of a large part of the soil in the hands of a small number of owners led to the prevalence of the system of leases and to peasants having to work as wage-earners.

The legal basis of agrarian reforms was provided by a large number of laws promulgated in the various countries. The elaboration of the main lines of agrarian legislation differed widely according to the economic and social structure of the countries concerned.

The land to be used for the creation of peasant farms was obtained partly from the domains of the State, but chiefly from the expropriation of large estates. In some countries the land was purchased on the open market and partial expropriation was resorted to only when the organizations entrusted with agrarian reform were unable to obtain sufficient land otherwise. The measures relating to compensation granted in case of expropriation of the large estates also varied widely from one country to another. The sizes of the holdings to be created were fixed on the principle of a fair adjustment of the area of the farm to the labour resources of the peasant family, so that it should not exceed the existing capacity of the farm while at the same time offering the family the possibility of earning the minimum required for a livelihood. In some cases, the land was merely divided into equal allotments among the various persons entitled to a share.

The immediate result of the agrarian reform was the transformation of the traditional agrarian structure of all the countries of Central and Eastern Europe.

The following table shows the results of the agrarian reforms from the standpoint of reorganization of the land system in all the countries where it has been introduced.

TABLE XII. — *Results of agrarian reform in the Eastern and South-Eastern European countries between 1918 and 1938.*

| Country | Year | Land obtained for purposes of agrarian reform (hectares) |
|--------------------------|------|--|
| Finland | 1937 | 1,021,693 |
| Estonia | 1938 | 2,306,700 |
| Latvia | 1938 | 3,396,815 |
| Lithuania | 1938 | 1,200,000 |
| Poland | 1938 | 2,524,000 |
| Czechoslovakia | 1938 | 4,068,370 |
| Hungary | 1936 | 600,000 |
| Romania | 1938 | 6,003,800 |
| Bulgaria | 1936 | 350,000 |
| Yugoslavia | 1938 | 2,484,481 |
| Greece | 1929 | 1,250,000 |
| Total | | 25,205,859 |

The area of land which was made available for agrarian reform was thus very large. Over 25 million hectares changed hands during the period 1918-1938. The two size extremes of agricultural property—the *latifundia* and the excessively small holdings—have given place to the small and medium-sized peasant farms.

6. — The modes of farm operation in European agriculture.

From the standpoint of the economic and social objectives of agrarian policy, the modes of farm operation are of extreme importance. It is well-known that these modes depend on a whole series of factors of an economic, social intellectual and even psychological character, and that they differ not only from one country to another, but also from one region to another in the same country.

This problem has already been touched upon when speaking of the agrarian structure of Scotland and Ireland. It will be discussed here in greater detail in order to stress the difference existing in the extent to which the various farming methods are represented in European agriculture; special attention will be given to tenant farming and to farm operation on a crop-sharing basis, with particular reference to *métayage*.

The evolution of the modes of farm operation.

In order to be in a position to follow the changes which have occurred in the modes of farm operation during the past decades, we have attempted in the following table to give a numerical illustration of the extent to which these methods are used in nearly all European countries, in so far as possible, before and after the war of 1914-1918.

In the first place we see that in nearly every European country farming ownership predominates and that it is most prevalent in Ireland, where in 1929 97.5 per cent. of the total farm area was operated on this basis. In most of the other countries this form of operation accounts for from 70 to 90 per cent. of the farm area. In France, Italy, Belgium and the Netherlands the percentages vary between 40 and 60 per cent.

But even in the few countries where tenant farming predominates, the tendency towards an increase in the aggregate area of farms managed by the owners themselves has become increasingly evident during the past few years. Thus, in England and Wales, where the percentage has increased from 10.6 per cent in 1913 to 36 per cent. of the total farm area in 1927 (no more recent figures are available), and in Scotland where it has increased from 10.6 per cent. in 1913 to 31.5 per cent. of the area in 1931. Belgium seems to be the only exception: here the area of farms operated on a basis of farming ownership has fallen from 46 per cent. in 1910 to 41 per cent. in 1929, although the number of farms operated by the owner himself rose from 28 per cent. in 1895 to 48.2 per cent. in 1929.

Tenancy, on the other hand, is declining almost everywhere. In Germany, indeed, the area operated by tenant farmers fell from 12.6 per cent. in 1907 to 10.7 per cent. in 1933; in France the area declined from 36 per cent. in 1892 to 30 per cent. in 1929.

Besides these two methods of farming, there are still certain countries where the system of share cropping in various forms is very widespread. Up to a certain point, this represents an intermediate form between owner and tenant farming.

Under the system of crop-sharing, the gross income is shared proportionately by the owner of the land and the share-cropper. The share-cropper enjoys an advantage in that in the case of loss of income the risk is shared by the owner, a certain community of interests being thus established between the owner and the cultivator of the land. Moreover, this method of farming, even more than tenancy properly so-called, enables the farmer who has no capital to undertake the operation of a farm on his own account.

In Italy this mode of operation, mainly in the form of *mezzadria* represented 15.8 per cent. of the total farm area in 1930, while in France *métayage* represented 10 per cent. of the total area in 1929. Share-cropping is also fairly widespread in some of the Eastern European countries.

Besides these different modes of individualistic form operation, mention may be made of a characteristic collective form, found especially in Italy, where it is well-known, though sporadic, and is called "collective tenancies". This

TABLE XIII. — *Proportion of number and area of farms operated on a basis of farming ownership, tenancy and share-cropping or metayage in relation to the number and area of all farms.*

| Country | Farming ownership | | Tenant farming | | Share-cropping or metayage | | |
|---|-------------------|----------|----------------|------|----------------------------|------|----------|
| | number | area | number | area | number | area | |
| <i>Great Britain and Northern Ireland</i> | | | | | | | |
| England and Wales. | 1913 | 11.2 | 10.6 | 88.8 | 89.4 | — | — |
| | 1927 | — | 36.0 | — | 64.0 | — | — |
| Scotland. | 1913 | 7.3 | 10.6 | 92.7 | 89.4 | — | — |
| | 1931 | (1) 22.6 | (2) 31.4 | 77.4 | (2) 68.5 | — | — |
| France | 1892 | 70.7 | 52.8 | 23.0 | 37.0 | 6.3 | 10.2 |
| | 1929 | 74.7 | 59.9 | 19.1 | 30.0 | 5.4 | 10.1 |
| Germany. | 1907 | — | 86.3 | — | 12.6 | — | (3) 1.1 |
| | 1933 | — | 88.7 | — | 10.7 | — | (3) 0.6 |
| Italy | 1930 | 59.1 | 57.5 | 13.5 | 12.7 | 12.6 | (4) 15.2 |
| Ireland | 1929 | — | 97.5 | — | 2.5 | — | — |
| Belgium | 1895 | 27.9 | (5) 45.8 | — | — | — | — |
| | 1929 | 48.2 | 40.9 | 51.8 | 59.1 | — | — |
| The Netherlands . . . | 1910 | 50.8 | 47.2 | — | — | — | — |
| | 1930 | 53.3 | (6) 51.0 | 46.7 | 49.0 | — | — |
| Switzerland | 1929 | — | (8) 80.6 | — | 16.9 | — | (2) 2.5 |
| Norway | 1929 | 85.7 | — | 14.3 | — | — | — |
| Denmark | 1901 | 89.0 | 90.3 | 4.6 | 7.8 | 6.4 | (7) 1.9 |
| | 1919 | 94.0 | — | 6.0 | — | — | — |
| Sweden | 1913 | } 72.6 | — | — | — | — | — |
| | 1920 | | — | — | — | — | — |
| | 1932 | | 80.4 | 73.3 | 19.6 | 26.7 | — |
| Estonia | 1929 | — | 72.4 | — | — | — | — |
| Latvia | 1929 | — | 84.3 | — | — | — | — |
| Lithuania | 1930 | — | 89.4 | — | — | — | — |
| Finland | 1910 | 56.6 | — | — | — | — | — |
| | 1929 | 88.9 | — | — | — | — | — |
| Poland | 1921 | 85.4 | — | — | — | — | — |
| Czechoslovakia | 1930 | 55.7 | 90.6 | — | — | — | — |
| Romania (former King- dom) | 1913 | 60.0 | — | — | — | — | — |
| Yugoslavia | 1931 | 92.0 | — | — | — | — | — |
| Hungary. | 1895 | 86.7 | 68.2 | — | — | — | — |
| | 1935 | — | 85.0 | — | — | — | — |
| Bulgaria | 1934 | 97.0 | — | — | — | — | — |

(1) Farms belonging entirely or mostly to farmers. — (2) Only the area of arable land, meadows and pastures has been classified as area owned or rented. — (3) Land made available by owners for agricultural workers instead of wages (*Deputat*), the area often being less than 0.5 hectares; other land (communal grants, various properties) comprising 0.5 per cent. of the total area of holdings. — (4) There are also mixed farms representing 14.8 per cent. of the total number of holdings and 14 per cent. of the total area. — (5) Year 1910 in respect of area. — (6) The data refer to areas operated under farming ownership or leased and do not correspond to the area of the holdings. — (7) In usufruct. — (8) Farms with over 2 hectares of arable land.

type of farming will be described in more detail when dealing with Italy. Similar enterprises are also found in Romania, Bulgaria and Greece, although, especially since the introduction of agrarian reform, their numbers are limited.

Economic importance of tenancy
and share-cropping in the various countries.

England. — Commencing with tenant-farming in England, the classical home of this form of farming, the first point to be observed is that two principles have waited many long years for legal recognition. One is the principle of fixity of tenure and the other, that of the free choice of crops.

Tenants had for a long time been demanding fixity of tenure, or, in other words, protection against arbitrary eviction. This request met with tenacious opposition; it was alleged that it would imply illegitimate interference with the owner's rights and an unjustifiable restriction of his power to dispose of his landed property. It was not until 1875 that the tenant's rights were recognized by the *Agricultural Holdings Act* ⁽¹⁾.

This law provided for compensation to be paid to the tenant in case of eviction without reasonable cause. Only cases where eviction was justified by certain specified reasons were taken into consideration. These measures did not introduce fixity of tenure but were directed towards the punishment of a landlord who evicted a capable and solvent tenant.

Another law with wider scope was passed and entered into force in 1883. Under the terms of this law no contract was recognized as valid unless it was in conformity with the conditions specified in the law and guaranteed adequate compensation to the tenant. Subsequent enactments, and especially those of 1906, 1917, 1920 and 1923, extended the provisions for safeguarding the rights of the tenant farmer. Present legislation gives the tenant of any land the right, when he gives up his lease, to compensation for improvements carried out during his occupation. Whenever he intends to erect any buildings of a permanent character which may eventually alter the nature of the farm, the tenant must, however, obtain previous authorization from the landlord.

Under the same laws, a solution was provided for the second important problem, concerning freedom of cropping on the part of the tenant. Leases nowadays do not contain any clause relating to restrictive covenants obliging the farmer to follow certain rules in his rotation of crops. By increasing the duration of the lease, as is also the case in Scotland, to 21, 36 or 42 years and even to 99 years in cases of emphyteusis, which to a certain extent combines the advantages of ownership with tenancy without the disadvantages of the latter, the farmer is given the tranquillity required for the execution of improvements in the soil; these are amortized in the course of a longer lease and allow him

⁽¹⁾ *Monthly Bulletin of Agricultural Economics and Sociology*, International Institute of Agriculture, Rome, 1940, No. 10, p. 336.

to reap the benefits before he is obliged to leave the farm. In cases where he is compelled to leave before the expiry of the term he is legally entitled to compensation.

The much-discussed problem of the farmer's compensation for estate improvements executed by him includes many controversial questions of a juridical and economic order which call for a rapid solution under modern farming conditions. Juridical principles have accordingly had to be increasingly adjusted to modern practice in agriculture ⁽¹⁾.

France. — Tenant farming is still very widespread in France. At the time of the last farm census taken in 1929, about 30 per cent. of the whole farm area was operated by tenants, although this practice had diminished slightly during the last few centuries. A particularly interesting alteration has taken place in the form of tenancy contracts: the rent no longer consists in every case of an invariable sum paid throughout the whole term of the lease, but is established on the basis of the value in money of a given quantity of wheat or other product which vary in price from one year to another. Thus the risks due to price fluctuations of farm produce are shared between landlord and tenant.

As regards the tenant's compensation for improvements on the land leased, the law of April 8, 1933, which provides for a reduction in rents, declares that, even if it is the tenant who refuses to accept the new rent, he has the right to compensation for his outlay incurred before the promulgation of the law in question in connection with improvements made on the farm with the written authorization of the landlord, due account being taken of local customs. Such compensation must cover the damage suffered by the farmer because he can no longer benefit from the improvements made by him to the property during the period elapsing between the time of cancellation and the expiration of the lease. In case of failure to agree the amount of compensation is fixed by the courts of common law.

Tenancy, is found chiefly in the north of France, together with the large farms, while share-cropping (*métayage*) is more usual in the South. As early as the XV century *métayage* was the basis of agricultural organization throughout almost the whole of France, and although the Physiocrats, for economic reasons, were opposed to this method of farming, and although in its aspirations towards the absolute liberty of the individual the Revolution was also unfavourable to it, it has survived in France down to our own days. Through adjustment to the conditions of agriculture conducted on rational lines, *métayage* has made a notable contribution towards the improvement of farming standards in France.

Germany. — Germany belongs to the countries where, as has already been seen, tenant farming is practised on a limited scale. In 1933 leased lands in the former territory of the Reich represented 10.7 per cent. of the total farm

⁽¹⁾ Prof. G. CARRARA: *New Tendencies in the law on Compensation awarded to Tenants in respect of improvements. International Review of Agriculture.* International Institute of Agriculture, Rome, 1929, No. 5, pp. 231-219.

area, which amounted to 41,425,000 hectares, tenant farming being practised on an area of 4,445,000 hectares. This proportion rises however, to 16.7 per cent., if the area operated by tenants is considered in relation to the agricultural area which totals 26,624,000 hectares ⁽¹⁾. The reason of such an increase in the proportion of tenant farms is that wooded lands, which account for 12,489,000 hectares, are but little suited to tenant farming because of the long periods of reafforestation; consequently the forest area exploited by tenants is very small.

The proportion of tenant farming in relation to the total area and the agricultural area in the various size groups is illustrated in the following table.

TABLE XIV. — *Proportion of tenant farming in relation to the total area and agricultural land in the various size groups of farms in the former territory of the Reich (not including the Sarre) in 1933.*

| Farm size groups according to total area | Total area | Agricultural area | Leased lands | Agricultural area per 100 hectares of total area | Leased lands in relation to | |
|---|---------------------|-------------------|--------------|--|--------------------------------|--------------------------|
| | (in 1,000 hectares) | | | | total area (%) | agricultural area (%) |
| | | | | | | |
| From 0.5 to 2 hectares . | 934 | 865 | 257 | 92.6 | 27.5 | 29.7 |
| 2 " 5 " . | 2,584 | 2,376 | 604 | 92.0 | 23.4 | 25.4 |
| 5 " 20 " . | 10,630 | 9,226 | 1,504 | 86.8 | 14.2 | 16.3 |
| 20 " 100 " . | 11,567 | 8,856 | 985 | 76.6 | 8.5 | 11.1 |
| 100 " 1,000 " . | 8,253 | 4,612 | 1,040 | 55.9 | 12.6 | 22.5 |
| 1,000 hectares and over . | 7,456 | 699 | 55 | 9.4 | 0.7 | 7.9 |
| Total . . . | 41,425 | 26,624 | 4,445 | 64.3 | 10.7 | 16.7 |

This table shows in the first place that as the size of the farm increases, the proportion of agricultural area in relation to total area always decreases; in the smaller size groups the proportion is 92.6 hectares of agricultural area for every 100 hectares of total area in relation to the average for the Reich which is 64.3 hectares. This proportion is only 9.4 hectares in the highest size group (1,000 hectares and over). At the same time we find that almost everywhere, as we come to the larger size groups, the proportion of land leased to tenants decreases, both in relation to total area and to agricultural area. In the smaller size groups the corresponding percentages are around 27.5 per cent. and 29.7 per cent.; in the larger size groups, on the other hand, they fall to 0.7 per cent. and 7.9 per cent. Only the farms with an area varying between 100 and 1,000 hectares are an exception of this rule: the percentage of leased land is higher

⁽¹⁾ KRAUSE, Dr. Heinz.: Statistischer Überblick der landwirtschaftlichen Pacht in Grossdeutschland. *Berichte über Landwirtschaft*, Vol. XXIV, Part 4, Berlin, 1939, p. 707.

than in the preceding size group (20 to 100 hectares), being 12.6 per cent. for the total area and 22.5 per cent. for the agricultural area, compared with 8.5 per cent. and 11.1 per cent. in the 20 to 100 hectare size group, because this latter group includes a fairly high number of leased farms belonging to the State. In the highest size group (1,000 hectares and over), the percentage of leased land is the lowest of all, as has already been observed, because these farms include large areas of wooded land.

The proportion of leased farms in relation to the total area of all farms has remained almost unchanged throughout the last few decades. An "interior movement" as it is called by M. Krause, has however taken place among the leased lands on the large farms with an area exceeding 100 hectares involving an increase in peasant farms with an area varying between 10 and 20 hectares. Obviously this must be attributed to the same economic reasons as those which usually encourage the development of this group of peasant farms to the detriment of the larger size group of over 100 hectares. These reasons have already been discussed in a previous article⁽¹⁾.

Most of the land leased to tenant farmers is found in North-West Germany where the percentage is between 15 and 17 per cent. of the total farm area. On the other hand, in the south-east of Germany and in the Eastern Marches, the average is only between 2 and 5 per cent. and consequently there the percentage of land operated by owners is the highest.

The mutual relations between the tenant farmer and his landlord have been governed in Germany since the last war by the regulations for the protection of farmers promulgated on June 9, 1920 with amendments dated July 23, 1925 and April 22, 1933. These regulations were abolished on August 15, 1940 and replaced by the decree which codified the different legislative measures concerning tenant farming (Regulations for the protection of tenant farming promulgated on July 30, 1940). The new regulations contain important rules safeguarding tenant farms, including the extension of leases on land and fisheries, notice of termination, change and cancellation before the term of expiry of leases on land, etc. As regards in particular the extension of leases, the Tenancy Bureau may, on request, declare notice given as being null and void and, if necessary, establish the duration of the contract for a suitable term. This Bureau is also empowered to extend for a suitable term a contract which is on the point of expiry without notice and may also renew a lease which has expired for another reason, establishing its duration for a suitable term, if this procedure is necessary in order to ensure the nation's food requirements or to guarantee a satisfactory utilization of the soil.

The functions of the Tenancy Bureau are performed by the district court (*Amtsgericht*) with right of recourse to the Court of Appeal; in the case of leases on hereditary peasant holdings or on land belonging to such holdings, the court

(1) Monthly Bulletin of Agricultural Economics and Sociology, International Institute of Agriculture, Rome, November, 1940, p. 366.

which deals with integral succession (*Anerbengericht*), substitutes the Tenancy Bureau and the court dealing with the legal cases concerning hereditary peasant holdings (*Erbhofgericht*) substitutes the Court of Appeal.

The Corporation of Agriculture of the Reich has recently drafted a standard lease contract applicable throughout the Reich. The duration of the lease was fixed at 18 years for farms and 9 years for very small holdings.

Practically no farms in Germany are operated on the crop-sharing basis.

Italy. — In Italy, in 1930, 12 per cent. of the total farm area was operated by tenant farmers and 15.8 per cent. by share-croppers (*mezzadri*). There were also farms operated partly by owners, partly by tenants and *mezzadri*, which covered 14 per cent. of the total farm area.

As regards tenant farming on rural estates in Italy, the latest legislation, namely "General Regulations for the renting of rural property to lessees who are not direct farmers", dated May 10, 1939, provides that in order to permit farming to be carried on on more rational lines and to reduce the tenants' risks, the leases must as a rule be of long duration. The term of the lease is established in the contract by the parties in accordance with custom and with the rotation practised in the various regions in accordance with the rules of good farming. Except in special and extraordinary cases, the length of the leases must be at least sufficient to enable the rotation normal in the region concerned to be practised.

In connection with compensation for improvements on the property made by the tenant, the law provides that those which are called for solely by the efficient and rational cultivation of the soil shall not as a rule be considered as improvements and do not therefore entitle the tenant to compensation. Account will however be taken of these when the closing balance is drawn at the end of the lease. No work of reconstruction or replacement which does not increase the productivity of the soil and does not lead to any real economic advantage will be considered as an improvement.

The following procedure is adopted as regards improvements which may become necessary and useful as the result of particular circumstances arising during the lease and which, as a rule, are not made after the first half of the term of the lease: when the estimated expense exceeds 10 per cent. of the total rent to be paid over the remaining years of the lease, the improvements may not be executed except by agreement between the two parties. On the other hand, when the estimated outlay is under 10 per cent. of the total rent to be paid for the remaining years, the party desirous of undertaking the work must in the first place seek the consent of the other party. In case of refusal, the necessity and economic utility of the improvement must be ascertained in common accord between the competent syndicates. If they are in favour of the improvement, the landlord is requested to carry out the work; if he refuses, the work of improvement is executed by the tenant. After the authorization to proceed with these improvements has been given, the parties must come to an agreement concerning the adjustment of financial matters, on the basis of the value of the transformation.

A special form of tenancy is that of "collective tenancy" which is an original form of Italian co-operation, consisting of an association of agricultural workers. These associations undertake the entire management of farms and assume all the risks of the enterprise. In specific cases of tenancy, they obtain the land by means of a farming lease; in other cases, they obtain it by means of an income-sharing contract (share-cropping in its various forms), or by a purchase contract; the form of contract makes it possible to distinguish between collective tenancy, collective share-cropping and collective ownership. It is the custom now, however, to use the term "collective tenancy" for any association undertaking the operation of a farm, the form of contract under which the land has been obtained being overlooked.

There are two systems of collective tenancy. In that which goes by the name of joint operation, the members work together on the land as a whole; in the system called individual operation, each member operates an allotment for which he is responsible. In the former case, the members belong for the most part to the class of day labourers; in the latter case, they are either day labourers, or else small-holders or small share-croppers who have a farm elsewhere; neither the one type of worker nor the other could earn a sufficient income to support his family without this subsidiary occupation. The length of the contracts runs from a minimum of one year, to three, nine, fifteen years, etc. Land operated under a collective contract belongs either to charitable institutions or other organizations, or to private landowners.

The need to institute a credit organization suited to the special conditions and requirements of this form of association has led the Government to create a section for land and agricultural credit in the *Istituto Nazionale di Credito per la Cooperazione*, now known as the *Banca Nazionale del Lavoro*. The work of this section consists of opening credits for these associations of agricultural labourers.

It is not always easy, however, for these collective tenancy enterprises to obtain the necessary land; as a rule, it is supplied by private individuals and, during the past few years, by charitable institutions.

"Collective tenancy" farms are a difficult experiment from the economic standpoint, but are interesting from the social point of view; in several cases this method of farming has contributed towards the solution of settlement problems which would have been hard to solve in any other way.

The principle of collective management of the land by associations of agricultural workers which has found its first and most important realization in "collective tenancy" under joint management, has once again been confirmed by the agreement concluded in May, 1940, between the *Ente Nazionale Fascista della Cooperazione* and the *Confederazione Fascista dei Lavoratori dell'Agricoltura*. This agreement contemplates the further development of agricultural co-operative associations formed for the purpose of farming. The land purchased by the associations must remain their undivided property if they are to fulfil their mission permanently and maintain their farm equipment, as well as the technical means required to ensure the uninterrupted progress of production.

The members of the co-operative associations to be formed must be agricultural labourers. The standard regulations contemplate the annual deduction of a given sum from the profits; this sum is accumulated in a special account, which constitutes a sinking fund for the purchase of land.

In every province with at least three of these co-operative associations of agricultural labourers, they will be encouraged to form a provincial Consortium with the following objects in view:

(1) to ensure that the co-operative associations combined in a consortium obtain technical and administrative help by instituting services in common in order to reduce the expenses which each association would otherwise have to meet separately;

(2) to intervene with landowning institutions or private individuals in order to facilitate the purchase of land; to intervene in connection with the renewal of old leases and to conclude new contracts at the request of the co-operative associations concerned;

(3) to enter into engagements with the State, with institutions or with private individuals in connection with land reclamation schemes or other works, even of an exceptional nature, in the interest of the associations combined in a consortium.

The form of share-cropping known as *mezzadria* is represented in its typical and purest form in Tuscany, where it is rooted in age-old tradition; it also predominates in Umbria and the Marches. This form of farm operation is also very widespread in Venetia and Emilia, where it has reached a high degree of perfection. Mixed share-cropping is found in the dry districts of Lombardy and various forms of this type of contract exist in the Abruzzi and Calabria. Leases and sub-leases are also in force in Sicily, where this kind of contract is called *metateria*. The typical regions of share-cropping however, are found in Central Italy (¹).

The law dated May 13, 1933, defined the juridical form of share-cropping by completing the measures contained in the Civil Code. Under the terms of this law, which establishes the general rules governing the share-cropping contract, this contract lasts one year, and is subject to tacit reconduction from year to year. Whichever of the parties does not intend to renew his contract must give the other party notice of its denunciation within the period established by the general agreements, having due regard to local usage; in any case, this period may not be less than six months before the expiry of the contract.

The management of a crop-sharing farm is in the hands of the landlord, who may perform his duties either personally or through an agent. His management must always be in harmony with the rules of good farming technique and with the duties which the Fascist Corporative State imposes on producers.

(¹) COSTANZO, G.: Share Tenancy in Italy. *International Review of economic and social Institutions*. International Institute of Agriculture, Rome, January-March, 1924.

Controversies arising out of the application, interpretation and renewal of the general share-cropping agreements, are solved on the basis of the provisions of syndical and corporative law.

Among European countries where tenant farming is most widespread, mention may also be made of Belgium and the Netherlands.

Belgium. — In Belgium, under the terms of the law dated March 20, 1929, every clause restricting the liberty of the farmer in his methods of cultivating his land, in his work or in the free disposal of his products is null, with the exception of the clause concerning his obligation to restore the land leased by him with crops equivalent to those which he found on taking over the property.

The duration of the lease of rural property is arranged between the parties. When a tenant takes over land for the first time the lease may not be less than nine years, regardless of all provisions and customs to the contrary. Leases of rural property whose duration is determined by law or in the lease contract itself do not terminate unless notice is given at least two years before the expiry of the contract.

The outgoing tenant is entitled to compensation for the remaining crops as well as for the permanent improvements he may have carried out.

These are the essential principles regulating tenancy in Belgium at the present time; in several instances they have made alterations in the corresponding provisions in the Civil Code, especially in connection with the establishment of nine years as the minimum duration of the lease and in offering the outgoing tenant the possibility of obtaining compensation for the permanent improvements carried out by him.

The Netherlands. — In the Netherlands tenancy is governed by the law of May 31, 1937. Under the terms of this law, tenancy contracts are valid for an indeterminate period. Contracts for a definite period may be concluded for the maximum duration of a year and only in cases when so short a term is rendered necessary by the nature of the property leased or by special circumstances.

When a lease contract has been concluded for an indefinite period, it can be rescinded unilaterally only on written notice from one of the parties. The parties may agree that neither party or the lessor may give notice before a certain period has elapsed. Notice must be given at least 18 months before expiry of the contract.

M. Van Nispen Tot Sevenaer ⁽¹⁾ considers that the originality of this law lies in its prolongation for an indeterminate period. He adds, however:

"Naturally, the leases for an indeterminate period offer considerable inconveniences in times when prices are rapidly changing or when the general economic situation is in a state of flux. For this reason the law gives the parties

⁽¹⁾ The Dutch Law on Agricultural Leases. International Bulletin of Agricultural Law. International Institute of Agriculture, Rome, 1940, N. 1.

the right to ask for an increase or decrease in the tenant's rent. However, it must not be assumed that an interested party can at any time ask for the intervention of the court. This is decidedly not the case".

If tenancy has lasted for more than one year, the landlord is compelled, when the lease comes to an end, to give the tenant fair compensation for the improvements made by the latter on the holding during the last ten years. This compensation must not exceed the amount by which the value of the leased property at the expiry of the lease has been increased as a result of the said improvements.

The adjustment of all questions arising from tenancy contracts is carried out by the Tenancy Chamber of the cantonal court, which replaces the cantonal judge in every instance, except in cases contemplated by the Code of Civil Procedure.

On the whole, it may therefore be said that owner farming predominates to a considerable degree in European agriculture and therefore that it forms the pivot of the agrarian structure in Europe.

Tenant farming, on the other hand, is declining almost everywhere, although this method of farming often protects farmers against heavy debt. Agricultural ownership takes first place, however, for certain other reasons of an economic and social character.

Share-cropping is found chiefly in France and Italy, as well as in some of the Central and Eastern European countries. This method of farming gives very good results especially in the case of highly intensive crops, such as vines, olives, tobacco, citrus fruits, etc. Share-cropping seems to be most prevalent in regions inhabited by large families in the widest sense of the term, *i. e.* when understood as the family nucleus with all its relatives. In his association with the landlord, the share-cropper must, indeed, supply the labour, making use of the members of his family who are, like him, interested in the satisfactory operation of the holding.

7. — Comparison of the agrarian structure of the countries of Western Europe.

After describing the evolution of the agrarian structure in the various European countries and pointing out the characteristic features in each country, it would be interesting to attempt to compare the agrarian structures of all the countries studied and to illustrate their chief characteristics.

However tempting a study of this kind may be, it is unfortunately difficult to carry it out chiefly because, although there is an abundance of data on this subject, obtained from the first world agricultural census effected on the initiative of the International Institute of Agriculture, most of this information has been collected by different methods.

In the first place, as regards the methods adopted by the various countries for the classification of farms, four different types have been used in the twelve Western European countries under review: in Germany, Belgium, France, Ire-

land, Italy and Holland, the farms were grouped according to total area of holdings. Germany also grouped the farms according to area of agricultural land. Switzerland distributed the farms according to productive area, including forests, which amounts almost to total area. England and Wales, Scotland, Denmark and Norway arranged the farms in groups according to agricultural area. Norway made a second grouping according to the extent of arable land and permanent meadows. Lastly, Sweden classified her farms according to area of arable land ⁽¹⁾.

It will therefore be seen that these countries all used somewhat different methods of grouping. When holdings were grouped according to agricultural area, as, for instance, in England, Denmark, etc., numerous farms were included in a size group of smaller farms than would have been the case if the classification had been made according to total area, and *vice-versa*.

The scale adopted for the classification of farms also varied considerably from one country to the other. Thus, the scale used as a basis for grouping holdings in England and Scotland, for instance, is different from that used in other countries. On the other hand, the lower limits for including holdings in the census differ from one country to the other and consequently the percentages of farms belonging to the same group in the various countries do not always have the same meaning for each agrarian structure.

It will therefore easily be understood that the grouping of farms on such different bases makes it impossible to obtain homogeneous figures and that a comparison of the data collected in the following table cannot be accepted as absolute.

A study of the above table will show that, as regards both number and area of holdings, the size group from 5 to 20 hectares figures largely and simultaneously in most countries. The same may be said for the combined size groups from 5 to 20 hectares and from 2 to 5 hectares in certain other countries. In Germany this group of holdings from 5 to 20 hectares alone includes 35 per cent. of the farms and 25.6 of the total area. In France the corresponding figures are 33 per cent. of the number of holdings and 33 per cent. of the total area. This same group in Ireland embraces 38.6 per cent. of the holdings and 30 per cent. of the total area; in the Netherlands, 26 per cent. and 44.4 per cent. respectively; in Switzerland, 36.3 per cent. and 56.6 per cent.; in Denmark 34.2 per cent. and 38.5 per cent., and in Sweden, 23.2 and 41.0 per cent. This group of medium-sized peasant holdings or small farms, according to the country in which they are situated, is therefore, generally speaking, the central nucleus most widely represented in the agrarian structures of all these countries.

In some other countries this group of holdings from 5 to 20 hectare, combined with the 2 to 5 hectare group which immediately precedes it, also represents a high proportion of the number and area of farms. This is the case in Belgium, where these two groups of farms taken together represent 24.7 per cent.

⁽¹⁾ *The first World Agricultural Census (1930)*. International Institute of Agriculture, Rome, Volume I, 1939, p. 242.

TABLE XV. — *Distribution of farms in Western*
(in absolute and

| Country | Date of census | Farms | | Under 2 hectares | | From 2 to 5 hectares | |
|---------------------------------|----------------|------------------|---------------------------------|-------------------|----------------------------------|----------------------|-------------------|
| | | Total number | Total area in hectares | Number | Area | Number | Area |
| Distribution according to | | | | | | | |
| Germany | 16-VI 1933 | 3,075,454 100 | 41,566,785 100 | 849,218 27.7 | 950,720 2.4 | 796,790 25.9 | 2,611,679 6.3 |
| Belgium | 31-XII 1929 | 1,131,146 100 | 1,997,578 ¹⁾ 100 | 838,883 74.2 | 131,146 ²⁾ 6.6 | 194,914 17.2 | 520,115 26.0 |
| France | 1929 | 3,966,330 100 | 46,205,319 ¹⁾ 100 | 1,014,731 25.6 | 724,908 ²⁾ 1.6 | 1,146,255 28.9 | 3,796,252 8.2 |
| Ireland | 1-VI 1929 | 402,744 100 | 6,214,302 ³⁾ 100 | 89,715 22.2 | 58,223 ⁴⁾ 0.9 | 77,382 19.2 | 338,774 5.4 |
| Italy | 19-III 1930 | 4,196,266 100 | 26,251,744 ⁹⁾ 100 | 2,763,671 65.8 | 3,043,792 ¹⁰⁾ 11.6 | 532,827 12.7 | 2,092,259 8.0 |
| The Netherlands . . | 1930 | 372,081 100 | 2,150,403 ¹¹⁾ 100 | 137,936 37.1 | 42,243 ²⁾ 2.0 | 110,646 29.7 | 273,541 12.7 |
| Distribution according to | | | | | | | |
| Switzerland | 22-VIII 1929 | 236,095 100 | 1,446,447 ¹²⁾ 100 | 39,870 16.9 | 23,185 ²⁾ 1.7 | 100,894 42.8 | 282,267 19.5 |
| Distribution according to | | | | | | | |
| England and Wales (a) | 4-VI 1931 | 395,823 100 | 10,271,215 ⁵⁾ 100 | 72,984 18.4 | 91,718 ¹⁵⁾ 0.9 | 103,975 26.3 | 477,688 4.7 |
| Scotland | 4-VI 1931 | 75,850 100 | 5,169,023 ⁵⁾ 100 | 16,778 22.1 | 177,177 ⁴⁾ 3.4 | 18,530 24.4 | 529,978 10.3 |
| Denmark (b) | 1929 | 205,971 100 | 3,313,433 ²³⁾ 100 | 38,590 18.8 | 81,980 ²⁴⁾ 2.5 | 71,923 34.9 | 400,389 12.1 |
| Norway | 20-VI 1929 | 298,360 100 | 1,578,075 100 | 165,800 55.6 | 198,468 10.6 | 74,662 25.0 | 443,441 28.1 |
| Distribution according to | | | | | | | |
| Sweden | 15-IX 1932 | 669,751 100 | 20,584,079 100 | 362,372 54.1 | 2,627,576 12.8 | 116,515 17.4 | 4,718,135 22.9 |

(a) The figures have been completed with data from the *International Yearbook of Agricultural Statistics, 1937*, and with statistics contained in the work entitled *Denmark, International Yearbook of Agricultural Statistics, 1937*.

(¹) Farms under 1 hectare. — (²) From 1 to 5 hectares. — (³) From 0.4 to 2.02 hectares. — (⁴) From 2.02 to — (⁵) Over 81 hectares. — (⁶) Farms up to 3 hectares. — (¹⁰) From 3 to 5 hectares. — (¹¹) From 0.05 hectares — (¹⁵) From 2 to 8 hectares. — (¹⁶) From 8 to 20 hectares. — (¹⁷) From 40 to 121 hectares. — (¹⁸) Over 121 hectares. — (²²) Over 121.4 hectares. — (²³) From 0.55 to 3.3 hectares. — (²⁴) From 3.3 to 10 hectares. — 120 hectares.

European countries during the period 1929-1933.

(relative figures)

| From 5 to 20 hectares | | From 20 to 50 hectares | | From 50 to 100 hectares | | Over 100 hectares | |
|-------------------------------|---------------------------------|------------------------|---------------------------------|-------------------------|---------------------------------|-------------------|--------------------|
| Number | Area | Number | Area | Number | Area | Number | Area |
| 1,073,615 34.9 | 10,663,540 25.6 | 267,310 8.7 | 7,954,770 19.1 | 54,572 1.8 | 3,624,689 8.7 | 33,949 1.0 | 15,761,387 37.9 |
| 84,193 7.5 | 811,336 40.6 | 10,666 0.9 | 316,343 15.9 | 2,026 0.2 | 142,492 7.1 | 464 0.0 | 76,246 3.8 |
| 1,310,759 33.0 | 15,219,872 33.0 | 380,373 9.6 | 12,977,930 28.1 | 81,744 2.1 | 6,126,880 13.3 | 32,468 0.8 | 7,359,477 15.8 |
| ⁵⁾ 155,272 38.6 | 1,863,765 ⁶⁾ 30.0 | 50,909 12.6 | 1,450,625 ⁷⁾ 23.3 | 21,179 5.3 | 1,185,952 ⁸⁾ 19.2 | 8,287 2.1 | 1,316,963 21.2 |
| 746,168 17.8 | 7,018,012 26.8 | 106,961 2.5 | 3,188,628 12.1 | 25,575 0.6 | 1,782,090 6.8 | 21,064 0.6 | 9,126,963 34.7 |
| 96,756 26.0 | 953,710 44.4 | 24,092 6.5 | 696,311 32.4 | 2,456 0.7 | 151,638 7.0 | 195 0.05 | 32,940 1.5 |

to total area of farms.

productive area, including forests.

| | | | | | | | |
|----------------|-----------------|--------------|--------------------------------|------------|------------------------------|------------|---------------|
| 86,635 36.6 | 819,191 56.6 | 7,733 3.3 | 218,719 ¹³⁾ 15.1 | 498 0.2 | 29,360 ¹⁴⁾ 2.0 | 465 0.2 | 73,725 5.1 |
|----------------|-----------------|--------------|--------------------------------|------------|------------------------------|------------|---------------|

area of agricultural land.

| | | | | | | | |
|-------------------------------|----------------------------------|----------------|----------------------------------|---------------|----------------------------------|---------------|-------------------|
| ¹⁶⁾ 77,970 19.7 | 1,069,251 ⁶⁾ 10.4 | 93,701 23.7 | 3,401,649 ¹⁷⁾ 33.1 | 34,957 8.8 | 2,955,960 ¹⁸⁾ 28.8 | 12,236 3.1 | 2,274,949 22.1 |
| ¹⁹⁾ 15,187 20.1 | 1,112,768 ²⁰⁾ 21.5 | 16,167 21.4 | 1,680,751 ²¹⁾ 32.5 | 6,799 9.0 | 1,038,168 ²²⁾ 20.1 | 2,389 3.0 | 630,181 12.2 |
| ²⁵⁾ 70,487 34.2 | 1,275,313 ²⁶⁾ 38.5 | 20,450 3.9 | 924,152 ²⁷⁾ 27.9 | 3,428 1.7 | 331,765 ²⁸⁾ 10.0 | 1,073 0.5 | 300,034 9.0 |
| 52,730 17.7 | 724,792 45.9 | 4,844 1.6 | 180,447 11.4 | 292 0.1 | 26,239 1.7 | 32 0.0 | 4,718 0.3 |

area of arable land.

| | | | | | | | |
|-----------------|-------------------|---------------|-------------------|--------------|------------------|--------------|------------------|
| 155,372 23.2 | 8,438,349 41.0 | 27,997 4.2 | 2,328,535 11.3 | 5,100 0.8 | 1,138,815 5.5 | 2,395 0.3 | 1,332,669 6.5 |
|-----------------|-------------------|---------------|-------------------|--------------|------------------|--------------|------------------|

International Institute of Agriculture, Rome 1937. — (b) The figures have been completed with data from the published by the Danish Ministry of Foreign Affairs and Statistical Department, Copenhagen, 1929, 1938 and 1939. 6.07 hectares. — (5) From 6 to 12 hectares. — (6) From 20.23 to 40.47 hectares. — (7) From 40.5 to 81 hectares. and under 1 hectare. — (12) From 0.25 to 1 hectare. — (13) From 50 to 70 hectares. — (14) Over 70 hectares. — (19) From 6.07 to 20.23 hectares. — (20) From 20.23 to 60.70 hectares. — (21) From 60.70 to 121.4 hectares. — (25) From 20 to 30 hectares. — (26) From 30 to 60 hectares. — (27) From 60 to 120 hectares. — (28) Over

of the holdings and at the same time 66.6 per cent. of the area. The situation in Italy is the same, the 5 to 20 hectare group taken together with the 2 to 5 hectare group embracing just under one-third of the number of farms and a little over one-third of the total farm area. Lastly, the same may be said for Norway where the figures are 42.7 per cent. and 74 per cent. respectively. Here again, the 5 to 20 hectare group, combined with the lower group of 2 to 5 hectares (small and medium-sized peasant holdings), determines, to a great extent, the nature of the agrarian structure in these countries.

The situation appears different in England and Scotland, where the size-group immediately above the 5 to 20 hectare group, *i. e.*, the 20 to 50 hectare group (20 to 40 ha. in England and 20 to 60 hectares in Scotland) comprises a considerable number of farms and covers the largest area: 23.7 per cent. of the number of holdings and 33.1 per cent. of the agricultural area in England and 21.4 per cent. of the number of holdings and 32.5 per cent. of the agricultural area in Scotland. It is therefore this group of farms which has a great influence on the agrarian structure of these two countries.

An even closer analysis of the table shows at the two extremes of the agrarian structure of each country, in the lowest size group of holdings with an area of less than 2 hectares, a comparatively large number of farms with a small total area and, in the highest size-group, with an area exceeding 100 hectares, a limited number of farms covering a large area. According to whether the ratio between the number of farms and their area is more or less marked in these two last-mentioned groups, we find in the various countries a more or less accentuated concentration or decentralization of the land, and this other factor completes the view of the agrarian structure as presented by the two groups of 5 to 20 hectares and 2 to 5 hectares. The very small holdings with an area of less than 2 hectares are very numerous in Belgium, Italy, Sweden and Norway, etc., but, as has already been observed, the minimum limit of size determining the inclusion of farms into this group, differs widely from one country to another. The proportion of large farms with an area exceeding 100 hectares is also different in the various countries.

In spite of the various discrepancies and of the other imperfections which diminish the scope of conclusions, this analysis enables us therefore to make some deductions of a very general nature and supplies us with some indications concerning the agrarian structure of Western Europe. Even if the countries had adopted the same system for grouping their farms, however, the economic value of the holdings included in the same category in the various countries might still have been too dissimilar to allow of drawing conclusions of real value, because of the different economic conditions ruling in agriculture in each country.

The agrarian structures of the European countries, in all of which an agricultural census was taken almost simultaneously, represent what might be called snapshots of the distribution of farms between 1929 and 1933. By emphasizing the large number of farms contained in the 2 to 5 hectare groups and especially in the 5 to 20 hectare groups, these snapshots confirm what has already been observed in the course of the analysis of the agrarian structure of the various countries, namely, that there is a tendency almost everywhere to create small and medium-sized holdings at the expense of the large farm. This appears to be

the general trend of present changes in the agrarian structure of Europe. Economic reasons, social considerations and the objectives of the population policy combine to give a steadily increasing importance to the peasant holding in the general structure of contemporary social life.

Our analysis, be it said once more, does not go beyond a mere approximation, an attempt at comparison between the agrarian structures; a comparison properly so-called, must be postponed for the present. Perhaps it may be possible later to make a new attempt on the basis of the results of the second world agricultural census which it is to be hoped, will be more homogeneous.

This attempt at a comparison of the agricultural structure of the Western European countries concludes the first part of our study.

(To be continued in April 1941).

M. TCHERKINSKY

INTERNATIONAL CHRONICLE OF AGRICULTURE

SWEDEN

The year 1939-40 was on the whole satisfactory for Swedish agriculture, although communications between Sweden and many of its western outlets—which are highly important both for her exports of agricultural products and for her imports of fertilizers and concentrated feeds—were extremely difficult during the first seven months of the war and became absolutely impossible after April, 1940. Crops were good in 1939 and the farmers' position with regard to their receipts and expenses was favourable, as will be seen from the table given below, the index of receipts (1935-37 = 100) having risen from 111.7 in 1938-39 to 126.6 in 1939-40, while the increase in expenses during the same period was only 109.9 to 119.3. The accountancy results for the year 1939-40 have not yet been published, but it seems likely that they will not be lower than those for 1937-38, when the relation between the index numbers of agricultural receipts and expenses, as shown in the following table, were less satisfactory than in 1939-40 and when the Swedish farm accountancy results published by the Swedish Agricultural Union showed that the average net return in percentage of invested capital for farms in the various size groups was 3.8 per cent. in Central Sweden and 6.5 per cent. in Southern Sweden.

No index numbers are as yet available for the past months of the current agricultural year. It is obvious, however, that during this period agriculture has encountered serious difficulties, such as the bad harvest in 1940, the calling-up of farm workers and the interruption of communications with the west which, as pointed out above, since April has prevented the usual imports of fuels, concentrated feeding-stuffs and chemical fertilizers as well as the export of the surplus whose production was formerly rendered possible by the imports of concentrates and fertilizers mentioned above.

On the other hand, these difficulties will, however, in no way endanger the capacity of home production to meet the country's food requirements, even in the eventuality of a long blockade. By laying in large stocks of wheat and rye, the deficit of the 1940 crops has been fully made good as regards breadmaking cereals which are produced in

*Index numbers of farm receipts and expenses compiled
by the Swedish Agricultural Union.*

(1935-37 = 100).

| | 1938-39 | 1939-40 |
|--|--------------|--------------|
| <i>Receipts.</i> | | |
| Cereals | 97.9 | 113.6 |
| All vegetal products | 100.2 | 122.3 |
| Milk and dairy produce | 118.0 | 133.1 |
| Livestock for slaughter | 113.9 | 122.5 |
| All animal products | 115.6 | 128.1 |
| <i>All agricultural products</i> | <i>111.7</i> | <i>126.6</i> |
| <i>Expenses.</i> | | |
| Purchases of fertilizers and lime | 101.5 | 113.0 |
| Purchases of concentrated feeding stuffs | 107.3 | 121.9 |
| Machinery and implements | 110.9 | 119.0 |
| Cost of tractors | 110.0 | 137.2 |
| Sundry expenses | 101.7 | 117.7 |
| Building materials | 114.0 | 123.0 |
| Land improvements | 126.4 | 129.9 |
| Wages | 116.7 | 127.0 |
| Taxes | 92.4 | 94.0 |
| <i>All expenses</i> | <i>109.9</i> | <i>119.3</i> |

sufficient quantities in normal times to meet the country's requirements; stocks of concentrated feeds for animals, and above all of chemical fertilizers, are such as to permit agriculture to maintain output at a satisfactory level, and it will certainly be possible, as has been done up to the present, to face the difficulties resulting from mobilization, requisition of horses and tractors, and the restrictions placed on the use of liquid fuels, by means of what are called the labour blocks, which will be described in detail below, and by an increasingly widespread use of charcoal gas generators for farm tractors, which are now being transformed for this purpose with strong encouragement from the Government.

As regards the capacity of agriculture, even if the present state of isolation from world markets should be prolonged, to satisfy the country's requirements of foodstuffs, it may also be observed that there are ample possibilities for an increase in the available quantities of foodstuffs produced by the diversion of some of the permanent artificial meadows to cereal growing, by raising the percentage of extraction when milling cereals, by restricting the use of potatoes for industrial purposes, by increasing the area sown to sugar beet, by extending the production of fodder crops rich in protein, so as to compensate for the decrease in the available quantities of concentrated feeding stuffs, and finally by intensifying the cultivation of oleaginous plants such as turnips, poppies, the soya bean, etc. Numerous measures with this end in view have already been adopted.

Measures relating to the marketing of agricultural products.

The war in Europe has led in some important fields to a change in the general principles governing the measures adopted by the State for regulating agricultural markets and prices. While formerly these measures were intended to protect the home

market against foreign competition and a decline in prices due to overproduction within the country, their principal objective will now be to stimulate production, without, however, causing such a rise in the cost of living as to incur the risk of involving the country in a period of inflation. This is the reason why the Riksdag, in its extraordinary session held in the autumn of 1939, as well as in the regular session of 1940, gave the Government full powers in the matter of price control in order to attain the above mentioned objective and to abandon the policy formerly recommended by the Riksdag, which consisted in an attempt to reach and maintain the price level for agricultural products during the period 1925-1929, which was considered as being quite satisfactory for agriculture.

Another important innovation introduced into the general plan of arrangements for controlling prices is the transformation of the method of providing funds for this purpose. This transformation was instituted in part during the extraordinary session of the Riksdag held in 1939 and was completed by a decision of the Riksdag in 1940. While the sums needed for the various measures of regulation were formerly provided exclusively by the proceeds of various dues and taxes on agricultural products paid into a special fund for price control, from July 1, 1940, the said dues and taxes are payable straight into the Treasury which is directly responsible for the grant of subsidies for the operation of price control. Altogether 120 million crowns have been voted by the Riksdag for this purpose for 1940-41.

As regards the measures of control in force for the various agricultural products during the agricultural year 1939-40, and for the past months of the current agricultural year, it may be said that most of these measures are the same as those already described in detail in the preceding Chronicle ⁽¹⁾, though some of them, such as those intended for the encouragement of exports of agricultural products, for instance, are not at present applied. A brief summary is given below of the most important changes made in these measures in order to ensure the country's food requirements.

Breadmaking cereals. — In order better to ensure supplies of rye and wheat, the system of purchases subsidized by the State was abolished in the autumn of 1939. This system provided for the purchase of a maximum of 150,000 tons through the intermediary of the Swedish Grain Company (a limited company established with Government participation) if, during the autumn of 1939, prices threatened to fall below 16.50 crowns per quintal of wheat and 16.00 crowns per quintal of rye or if, later, before the new crop was brought in, they showed a tendency to fall below the level of the above prices plus the cost of storage. This arrangement was replaced by the introduction of a system of *purchase guarantee*, (similar to that in force during the period 1931-35), according to which the Government undertook to purchase, during the period between June 1 and July 31, 1940, at 21.50 crowns per quintal, all the rye and wheat good for milling which had been offered to the company before May 15, 1940. In order to prevent a rise in the price of flour, the millers received a certain bonus from Government funds on rye flour while the tax on the milling of wheat flour was reduced; this tax was formerly imposed to prevent the purchase guarantee from giving too great a stimulus to wheat growing and to cover the financial risk of intervention on the market of breadmaking cereals.

For the 1940 harvest the guarantee price for rye and wheat offered for sale to the Swedish Grain Company before January 15, 1941, has been increased to 25 crowns per

(1) See this Bulletin No. 8, 1938.

quintal; the period for purchase runs from February 1 to March 31, 1941. To prevent the price of flour from rising in proportion to that of cereals, the millers receive compensation from the State amounting to 4 crowns per 100 kg. of rye or wheat purchased by the Company after September 1, 1940 on condition that the price of flour does not rise above a fixed level.

Among the latest measures for the control of the market of breadmaking cereals rendered necessary by present circumstances, mention should also be made of the decree promulgated in September 1940, which prohibited the use for livestock feeding of cereals suitable for human consumption and the simultaneous introduction of rationing of bread-making cereals. This last measure was intended to restrict consumption, so that, in spite of the short crops of 1940, it will not be necessary to use up all the emergency stocks stored in the country during previous years. The daily bread ration is about 300 grams per person, while provision is made for a supplementary ration for certain categories of workers.

Fodder. — Ever since the outbreak of war the duties upon oilcakes imported or prepared within the country have been abolished, together with the tax on imported oats, maize and some other fodders, two duties which were formerly levied to encourage the production of feeding stuffs and prevent an excessive increase in the numbers of livestock due to the use of foreign concentrated. At the same time oilcakes were requisitioned and rationed, while later the same was done with maize, oats, rye and wheat bran and molasses.

As regards trade in concentrated feeds, an agreement was concluded between the Government and the Association of fodder merchants (*Foderintressenternas förening*), a company composed of all the most important firms trading in feeding stuffs. Under the agreement, the Association of fodder merchants was granted the exclusive right to import concentrated feeds; it was also entrusted with arranging for the sale and distribution of these feeds according to the regulations drawn up by the Government Food Commission concerning prices, quantities, etc. If the expenses incurred should involve the Association in loss, the State covers this loss from Treasury funds, on the other hand, if profits are realized, they must be handed over to the Government.

In order to compensate for the decline in imports of concentrated feeds, an extensive propaganda campaign has been organized by the authorities and the agricultural organizations with the object of encouraging the farmers themselves to produce the proteins required for their livestock by intensifying the output of pulse, increasing the proportion of red clover and alfalfa in their hay, cutting their hay crop at an earlier date, drying it by artificial means, by ensilage according to the Virtanen method, etc. The Government grants loans on advantageous terms to encourage the installation of drying plants and the erection of silos for the ensilage of fodder on the Virtanen system. There is little doubt that in this way the country will succeed, within a comparatively short space of time, in becoming independent of oilcake imports.

Sugar and sugar beets. — The special measures, apart from customs tariffs, which have been applied during the past few years to stimulate the sugar industry, are based on contracts concluded between the State and the Swedish Sugar Company. The contract in force at the outbreak of hostilities had been concluded in accordance with the decisions taken by the Riksdag in 1938 and was valid until September 30, 1940. Like those which immediately preceded it, this contract granted to the Company a monopoly of sugar imports and guaranteed a minimum price to beet sugar growers, a minimum wage to workers in the beet fields and, to the Sugar Company, a price for sugar varying to a certain extent with the price fluctuations on the world market, but not below a fixed minimum.

According to the terms of the new agreement concluded between the Government and the Sugar Company for the period from August 1, 1940 to July 31, 1941, the Company keeps its exclusive right to import sugar; the decision concerning minimum prices for sugar beet and sugar have also been maintained, as well as the minimum wage for workers employed in the fields. The price of sugar, however is no longer affected by the variations of the world market, but depends exclusively on the cost of production within the country, and the company has obtained from the Government a guarantee covering these costs. The basic price guaranteed for beet with a sugar content of 16 per cent. which amounted to 2.70 crowns per quintal under the former contract, has now been fixed at 3.02 crowns for producers who obtain an average harvest of at least 360 quintals per hectare; the price is raised to 3.26 crowns per quintal when the average yield falls below 310 quintals per hectare.

As regards sugar regulations for the current year, it should also be noted that the total area sown to sugar beet has been increased by 10 per cent., following an agreement between the Sugar Company and the beet-growers, and that sugar has been rationed since April, 1940. As there are ample stocks of sugar and since rationing is only intended to ensure the fair distribution of consumption throughout the whole year, the rations are fairly large, having been fixed at about 500 grams a week for each person, not including the special allowances for the making of jams and syrups in the summer.

Potatoes. — Over and above the standing measures which were described in the former chronicle and which deal with the control of the price of potatoes for industrial uses, new measures have been adopted during the period under review for the purpose of ensuring supplies of cooking potatoes. Swedish starch and alcohol factories have undertaken to restrict their production should the potato harvest be poor and to include a clause in their contracts with producers to the effect that about 30 per cent. of the potatoes cultivated for industrial uses shall also be suitable for food. Only if not needed for food may these potatoes be used for industrial transformation.

Cultivation of oleaginous plants. — Lastly, among the measures taken since the outbreak of hostilities to stimulate the output of vegetal products, mention should be made of the increased cultivation of some oil-producing plants: colza, poppies, the soya bean and linseed. These measures, which have been rendered necessary by the threatening shortage of edible fats, are subsidised by the Government. Their chief immediate purpose is to increase the area of these crops cultivated for seeds during the coming year, so that within two years it will be possible to produce sufficient raw material for the manufacture of one-sixth of the average yearly consumption of margarine during the past few years.

The milk and edible fats market. — Besides the measures already adopted for the control of this market—such as the price equalization duty on milk for direct consumption and milk for manufacture, the excise duty on margarine, etc., which were described in the preceding chronicle—the Government, in consequence of the situation resulting from the events of April last, was compelled to adopt new measures intended to ensure the country's supplies of fats and to reserve all edible fats for food purposes. All fats intended for the manufacture of margarine were therefore sequestered in May, 1940, but it was simultaneously decided that the manufacture of margarine (except the quantities destined for baking and cake-making), should be entirely suspended until existing stocks of margarine and of butter intended for export but not at present exportable, had been exhausted, since these products do not keep as well as the raw materials used for the manufacture of margarine. The consumption of margarine was rationed and after the end of May the less well-to-do inhabitants of the country were also granted

a rebate on the price of butter, the Government contributing in large measure towards the cost of this measure. The rebate amounts to 1.30 crowns per kilogram on purchases of 400 grams of butter weekly for each person entitled to benefit from the measure. It is estimated that some two million people enjoy the advantage of this rebate on the price of butter. Later, in November, 1940, in order to increase the output of butter, the fat contents of cheese and cream was fixed at a maximum of 30 per cent. for the former (dry matter) and 15 per cent. for the latter.

As has already been said, there is no danger that the country will suffer from any serious shortage of fats even if the present isolation should be prolonged. The consumption of the past few years, which was fairly high—in 1938, for instance, it amounted to 11 kg. of butter, 9 kg. of margarine and 6 kg. of fat and medium-fat cheese per head of the population—must of course be reduced, but even if the isolation of the country should last until the existing stocks of imported concentrated feeds for livestock and of the raw material required for the margarine industry should be exhausted, the country's output of fats obtained entirely from home-produced raw materials would suffice, if the fodder crops are normal, to cover about three-quarters of the total consumption of edible fats in 1938.

Meat and eggs. — In 1939-40 and during the period of the current agricultural year which has already elapsed, all regulations formerly in force for the control of the meat and egg markets—import licences and duties, export bonuses, etc.—continued in operation. Since April 1940, foreign trade in these products has, however, been impossible and consequently these measures have remained without practical application. It must be mentioned in this connection that pig meat has been rationed since November 6, 1940, because of the reduced imports of concentrated feeds for fattening pigs and of the increase in the consumption of pork due probably in its turn to the small quantities of cheap fish placed on the market. The ration is 200 grams weekly per person, exclusive of bones. Pigs may only be slaughtered by authorized butchers holding a licence for the purpose. No rationing has been introduced for beef.

The land system.

New legislation concerning State aid for the establishment of small agricultural holdings and detached dwellings in rural districts. — Among the most important measures of agrarian policy taken in Sweden during the past year, mention should be made of the reorganization of the credit for assisting the poorer elements of the rural population to obtain small farms and detached dwellings.

In this field during the past thirty-five years the Government has contributed towards the creation of about one hundred thousand rural «own homes» for more than one-tenth of the rural population; two-thirds of these are small farms and the remainder consists of small detached dwellings. The total of loans granted by the Government for the above purpose during these 35 years amounted to about 400 million crowns.

The new measures referred to came into operation from July 1, 1940, and are embodied in two decrees dated June 7, 1940; i. e., the decree on the granting of State aid to the «own homes» movements and the decree concerning State subsidies for the establishment of workers' small holdings (*arbetarsmåbruk*).

When laying the foundations of the new legislation one of the principal objectives was to afford particular encouragement to the creation of the so-called *familjejordbruk*, or small family farms whose area should, on the one hand, be small enough to permit the farmer and his family to operate it without having recourse to any considerable extent to hired labour and, on the other hand, large enough completely to ensure the

maintenance of the family. Numerous small holdings created under the former legislation did not meet these requirements. These small family farms will be created by breaking up large farms, by means of settlement—properly so called—on virgin land in Northern Sweden, by granting leases in the same region of farms belonging to the Crown (*arrendeeegnahem*), and, what is equally important, by transforming incomplete small holdings into family farms, through improvements on the holdings as they stand at present, through the incorporation of additional land, or else through the combination of two or more holdings into one. It should however be observed that the work of creating small farms by breaking up large estates will be carried out in the future with extreme prudence. The size of these small family farms may, of course, vary in accordance with the nature of the soil and with other conditions, but in the opinion of the Commission of inquiry into the question of small holdings, the cultivated area of these holdings should as a rule be about 15 hectares; they should also include a wooded area of a size varying in accordance with local conditions. It has been suggested that the minimum wooded area should be between 12 and 25 hectares in Southern Sweden,—with the exception of the plains—between 24 and 32 hectares in Central Sweden and between 55 and 74 hectares in the Upper Norrland region.

Besides creating small family holdings, Government action under the new legislation aims, as in the past, to encourage the erection of detached dwellings for rural families (*bostadsegnahem*) and, wherever circumstances favour the development of this kind of rural property, the creation of auxiliary farms (*stödjordbruk*) and workers' small holdings (*arbetarsmåbruk*), i. e. farms for the sole purpose of providing the owners and their families with supplementary work offering them additional resources to those obtained from wages earned elsewhere.

The main lines of the new legislation regulating Government aid for the creation of "own homes" of various types mentioned above may be summarized as follows:

Loans for the purchase of a family holding (*familjejordbruk*) or an auxiliary farm (*stödjordbruk*), may be granted exclusively for the purchase of farms whose value does not exceed 30,000 crowns or in exceptional cases 35,000 crowns (formerly the loan for farms not fully equipped amounted to 15,000 or in exceptional cases to 20,000 crowns; in the case of farms already equipped the loans amounted roughly to between 12,000 and 16,000 crowns respectively).

Loans for the purchase of farms are granted in the form of agricultural loans and—if the wooded area on the estate is worth at least 1,000 crowns—in the form of forest loans, and the sum represented by these two loans may amount to a maximum of 90 per cent. of the total value of the holdings.

As regards their repayment both the forest loans and the agricultural loans are divided into two parts, one representing a fixed amount equal to 60 per cent. of the value of the holding and the other consisting of a sum subject to repayment which constitutes the balance of the price. The fixed sum is subject to interest but does not have to be refunded. For a period of five years the repayable sum also is subject only to the payment of interest, but after the lapse of that term, in the case of agricultural loans, it must be repaid in annual instalments over a period of twenty-five years. The repayable sum for forest loans must be extinguished according to the regulations established under the plan of exploitation, due account being taken of the income obtained from the forest. The interest rate is established by the Government when the loan is granted. It has been fixed at 3.6 per cent. for 1940 and 1941. Loans must be guaranteed by a first mortgage on the holding concerned. If it is advantageous to the person contracting the loan and the interests of the State are not impaired thereby, this first mortgage, granting that it does not exceed 60 per cent. of the value of the property, may however serve as security for a loan obtained from another lender.

If, owing to the nature and importance of the work required for putting the farm into operation, the need arises for further aid to enable the person purchasing the farm to cover his expenses, he may be granted, over and above the agricultural and forest loans, an "encouragement loan" (*premielån*) not exceeding 3,000 crowns (in exceptional cases 4,500 crowns). This form of loan is subject to interest. During each of the ten years following the year when the purchaser commences to pay instalments on the agricultural loan, he is accorded a remission of one tenth of the amount of the "encouragement loan".

In order to transform undersized farms into family holdings, special measures have been contemplated which in practice are very similar to those governing the granting of loans for the purchase of family holdings.

As regards the small leasehold farms with the characteristics of a family holdings (*arrendegård*) to be created on Crown lands, Government aid is based on the same principles as those embodied in the former legislation. The lease lasts for five years, after which the farmer may renew his lease or purchase the land outright. The rents are fixed on a fair basis taking due account of the probable return obtained from the land. A non-interest-bearing loan not exceeding 4,500 crowns may be granted to farmers for the purchase of live and dead stock. Repayment begins after the lapse of two years and has to be effected in 16 yearly instalments.

In the case of the purchase of detached family dwellings (*bostedsegård*) loans must not exceed 12,000 crowns (the limit was formerly 10,000 crowns). The security for this loan consists of a mortgage. The loans may amount to 75 per cent. of the value of the property. They consist of a fixed sum corresponding to 50 per cent. of the value of the property, the remainder to be extinguished in instalments. Loans may also be granted for building, works of reconstruction or enlargement to be carried out on existing dwellings. An interest rate of 4 per cent. is charged for 1940 and 1941 on loans granted between July 1, 1940 and June 30, 1941.

With the new provisions concerning the granting of loans for the creation of workers' small holdings (*arbetarsmåbruk*), it is intended to attain the same objective as that contemplated in the case of the auxiliary farms (*stödjordbruk*), but, while in the latter case it is sought to create those farms in regions where the borrower and his family will be able to obtain their principal livelihood from supplementary home industries such as fishing, rearing of animals for the fur industry, basket making, etc., the main purpose of the creation of workers' small holdings is to assist persons who obtain their staple income from forestry, rafting or other similar employment. The maximum amount of loans for workers' small holdings comes to about 7,000 crowns as compared with a former amount of 6,000 crowns. The loans consist of a fixed sum which does not require to be repaid, and a sum to be extinguished, instalments of one-thirtieth of the amount to commence after the lapse of five years. This latter part is free of all interest. On the fixed sum, on the other hand, the Government may charge interest at a rate to be established after the expiration of the period during which instalments are paid on the part to be refunded. If large families desire to enlarge their houses, they may obtain exceptional Government subsidies not exceeding 1,000 crowns.

The necessary conditions for obtaining any of the above forms of loans are not difficult to fulfil. All that is required, indeed, is that the person applying for the loan is of Swedish nationality, is at least 21 years of age and is known to be respectable, prudent in the management of his affairs and, when the loan is to be granted for the purchase of a farm, that he has adequate knowledge of farming. Except in the case of workers' small holdings the borrower must also contribute to a certain extent in the setting up of the farm.

Agricultural credit.

Loans granted for the conclusions of agreements and assistance loans. — A royal decree dated June 7, 1940, which came into force on July 1, of the same year, contains new provisions concerning Government activity in the field of credits in favour of farmers involved in economic difficulties. These loans are only granted on condition that the difficulties in question derive from agricultural activities properly so-called, that the farmer himself has no other means of obtaining a loan on reasonable terms and that the borrower, if he obtains the loan, appears to be able satisfactorily to continue the operation of his farm.

Loans are granted either in the same form as those given under certain conditions with a view to helping a debtor to come to an accommodation with creditors, or else in that of assistance loans. These latter are granted when it is impossible to grant loans for accommodation with creditors, but when there are other reasons which justify assistance by means of a loan. Whether these loans are of the type of accommodation loans, or take the form of assistance loans, they must not exceed 800 crowns and 40 per cent. of the value of the borrower's farm (or a maximum of 25 per cent. if the borrower has rented property from a third person), and the total must not exceed 10,000 crowns or in exceptional cases 15,000 crowns. The loan is granted on the security of a mortgage on the farm. No interest is charged for the first two years, after which the borrower pays 4 per cent.; after the fifth year he must begin to refund the loan at the rate of one-fifteenth of the sum in yearly instalments.

Agricultural Labour.

Labour blocks. — Among the measures taken to deal with the shortage of labour, horses, motor-cars and tractors for farm work resulting from mobilization, mention should be made in the first place of the so-called "labour blocks" (*arbetsblock*) which have been formed voluntarily and which constitute a kind of mutual aid society for the use in common of available labour, etc.; by February, 1940, about 75,000 of these blocks had been organized throughout the country, comprising 375,000 farms, or an average of 5 farms for each block. The total area cultivated by the blocks represented some 98 per cent. of the whole area cultivated in the country. The organization of the blocks, which has proved extremely efficient, not only during spring field work but also in harvesting, has not had to be used to the full this year, since leave has been granted extensively to mobilized soldiers during the period of field work.

Temporary abrogation of the law on working hours in agriculture. — Another important measure rendered necessary by the exceptional circumstances of the moment, in order to make the labour indispensable for field work available, is the temporary abrogation of the law in force concerning hours of work in agriculture fixed at 41 hours weekly for January, February and December, at 46 hours in March, October and November and at 54 hours for the period from April to September. Under the terms of a special law promulgated on June 14, 1940, governing derogations to the regulations concerning working hours, etc., the operation of the law on working hours in agriculture has been suspended until October 15 of the current year.

BIBLIOGRAPHY ON ECONOMIC AND SOCIOLOGICAL SUBJECTS

DIE STATISTIK IN DEUTSCHLAND NACH IHREM HEUTIGEN STAND. Ehrengabe für F. Zahn, herausgegeben von Friedrich Burgdörfer. Verlag für Sozialpolitik, Wirtschaft und Statistik, Paul Schmidt, Berlin, 1940. 2 Volumes, 1307 pages. RM 43.

[For the proper use of statistical data it is essential to be well informed on the technique adopted for the collection and preparation of data, this probable degree of completeness and accuracy, the possibilities of errors involved in the process of collecting data, the restriction of comparability due to changes in methods, etc. Such knowledge alone can serve as a reliable basis for the critical analysis of statistical results.

Since the publication, 30 years ago, by F. Zahn of his book « Die Statistik in Deutschland », the volume and importance of statistics – especially of agricultural statistics – have greatly increased, while statistical methods and technique have also undergone important changes. Information on this subject is generally to be found scattered in official publications, but does not always permit to draw from them a clear and complete picture of the situation. The book under review contains excellent monographs, mostly written by the experts from the statistical office of the Reich, covering all the ground of official statistics, as well as the other most important branches of statistics generally. Agricultural statistics are discussed in 17 studies, which occupy 150 pages in the second volume of the publication. One of them deals with the work of the Reichsnährstand in the field of farm statistics. Particularly interesting are the informations concerning the technique of the recently published statistics of landed property. Generally, the vivid presentation of the various means by which statistical data are obtained may give very useful hints to the statisticians for the organization of new enquiries. Special mention should be made of the essays dealing with various allied subjects, as for example prices and foreign trade. Particular attention should be given to the comprehensive studies in which President Reichardt analyses the tendencies of the development of official statistics, and – taking into account the fundamental importance for agriculture of population questions – to the Editor's own contribution on population statistics and policy.

The two volumes constitute a most reliable reference book for statisticians and economists.

W. S.

NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

for the fourth quarter of 1940 (*).

AGRICULTURE en temps de guerre; « Chambres d'agriculture ». Paris, Assemblée permanente des présidents des Chambres d'agriculture, Série IV, n° 1 (Sept. 1939)–, déc. [Formerly: "Chambres d'agriculture".]

(*) *List of abbreviations:* bihebd. (biweekly); bimens. (twice monthly); bimestr. (every two months); déc. (every ten days); étr. (foreign price); fasc. (copy); hebd. (weekly); int. (home price); irr. (irregular); mens. (monthly); n° (number); N. S. (new series); p. a. (per annum); q. (daily); sem. (half yearly); s. (series); trihebd. (every three weeks); v. (volume); trim. (quarterly).

N. B. — Between brackets [/] are given translations and explanatory notes not appearing in the title of the review.

BARI. R. Università. Facoltà di giurisprudenza. *Annali della Facoltà di Giurisprudenza* (già *Annali del Seminario giuridico-economico*). Bari, R. Università, n. s., v. 1 (1938)-, irr.

BOLETIM trimestral de estatística. Lourenço Marques, v. 15 (1939)-, trim. 10 \$ par fasc. (Colónia de Moçambique. *Repartição técnica de estatística*). [The second title in French: *Bulletin trimestriel de statistique*]. [Summary and titles of tables also in French]. [Formerly: *Boletim economico e estatístico*].

BOLLETTINO dei brevetti per invenzioni, modelli e marchi. Roma, n° 9/10 (1940)-, bimens. L. 36.- int. L. 80.- étr. (Ministero delle corporazioni. Ufficio centrale dei brevetti per invenzioni, modelli e marchi). [Formerly: *Bollettino della proprietà intellettuale*.]

BOLLETTINO delle Assemblee legislative... Pubblicazione a cura del Senato del Regno e della Camera dei Fasci e delle Corporazioni. Roma, 2° s. v. 13 (1939)-, sem. [Formerly: *Bollettino parlamentare*.]

BOLLETTINO delle biblioteche delle Assemblee legislative. Nuove accessioni e spoglio delle riviste... Pubblicazione a cura del Senato del Regno e della Camera dei Fasci e delle Corporazioni. Roma, n° 1-2 (1939)-, sem. [Formerly: *Bollettino parlamentare. Supplemento bibliografico*.]

BOLLETTINO risiero di informazioni. Azienda generale italiana risiera per l'esportazione (A. G. I. R. E.). Milano, v. 2 (1940)-, mens. (Ente nazionale risi).

CARACAS. Instituto nacional del cafe. *Revista del Instituto nacional del cafe*. Caracas, v. 1 (1939)-, irr.

GUATEMALA. Biblioteca nacional. *Boletín de la Biblioteca nacional*. Guatemala, v. 8 (1939)-, trim.

HAVI Külforgalmi adatai. Budapest, v. 1 (1936)-, mens. 2.- pengő par fasc. (A M. Kir. Központi statisztikai hivatal). [Monthly issue of external commerce. Royal Hungarian central office of statistics]. [Mimeographed.]

ITALIA centrale viti-vinicola. Arezzo v. 1 (1937)-, bimestr. L. 10 (*Bollettino dell'Istituto enologico della Toscana. Arezzo*). [Formerly: *Bollettino enologico toscano. R. Cantina sperimentale e Laboratorio enochimico di Arezzo*.]

LIST of importers and exporters engaged in trade between the United States and Italy, and news sheet. Milano, (nov. 1937)- (jan. 1940). bimens. (American chamber of commerce for Italy). [Since February 1940 combined with: "Bulletin of the American Chamber of commerce for Italy", of which it was formerly a supplement.]

MONTHLY report of the trade of Canada. (Imports for consumption and exports)... (Compiled from Records supplied by the Department of national revenue). Ottawa, v. 41 (1940)-, mens. \$ 0.75 par fasc. (Department of trade and commerce. Dominion bureau of statistics. External trade branch). [Second page of title: *Rapport mensuel du commerce du Canada (Importations pour la consommation et exportations)*. [Bi-lingual edition: English and French.] [Combining: "Quarterly report" and "Summary".]

PRODUSENTEN; medlemsblad for Norske melkeprodusenters landsforbund og Norges kjøtt- fleskesentral. Oslo, n° 1 (1940)-, irr. [Producer.] [Formerly: *Melkeprodusente*. (Milkproducer).]

RIVISTA geografica italiana... e *Bollettino della «Società di studi geografici» residente in Firenze*. Firenze, v. 44 (1937)-, 6 fasc. p. a. L. 30 int.; L. 35 étr. [Containing summaries also in German.]

SOUTHERN economic journal; a joint publication of the Southern economic association and the University of North Carolina. Chapel Hill, N. C., v. 7 (1940)-, trim. \$ 3.00.

UNITED STATES Government publications; monthly catalog issued by the Superintendent of documents. Washington, D. C., n° 541 (1940)-, mens. \$ 1.50 int.; \$ 2.10 étr. [Formerly: Monthly catalog U. S. public documents.]

VERORDNUNGSBLATT für die besetzten norwegischen Gebiete. [Der Reichskommissar für die besetzten norwegischen Gebiete], Oslo, 1940-, irr. [Second title in Norwegian: Forordningstidend for de besatte norske områder]. [Bi-lingual text: German and Norwegian.]

Prof. Ugo PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

AGRICULTURAL STATISTICS

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following explanations refer to crop conditions quoted in the crop notes and in the tables. — Crop condition according to the system of the country: Germany, including Ostmark and Sudetenland, Bohemia and Moravia (Protectorate); Hungary and Luxemburg: 1 = excellent, 2 = good, 3 = average, 4 = poor, 5 = very poor; Finland: 8 = very good, 6 = above the average, 5 = average; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = poor; Estonia, Latvia, Lithuania, Poland, Rumania and Sweden: 5 = excellent, 4 = good, 3 = average, 2 = poor, 1 = very poor; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; Portugal: 100 = excellent, 80 = good, 60 = average, 40 = poor, 20 = very poor; Switzerland: 100 = excellent, 90 = very good, 75 = good, 60 = fairly good, 50 = average, 40 = rather poor, 30 = poor, 10 = very poor; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = poor; Canada: 100 = crop condition promising a yield equivalent to the average yield of a long series of years; United States: 100 = crop condition which promises a normal yield; Egypt: 100 = crop condition which promises a yield equal to the average yield of the last five years. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

NOTE: The countries are listed throughout by continents (Europe, followed by the U. S. S. R., America, Asia, Africa and Oceania) in the French alphabetical order. In the tables the Northern Hemisphere precedes the Southern Hemisphere.

VEGETAL PRODUCTION

THE PROSPECTS OF THE 1940 WHEAT CROP.

Owing to the present circumstances, information on crop conditions and harvest prospects is lacking for a large part of Europe. It is thus impossible to give a complete report and a more or less exact summary of the probable production of this Continent. It is enough to bear in mind that France, Germany, the United Kingdom, the Protectorate of Bohemia and Moravia, the Polish territories — all countries which have suspended the publication of agricultural information on account of War — furnish about $\frac{2}{5}$ of the European wheat production, to understand the importance of the lacuna which make it impossible to give an estimate — even an approximate one — of the amount of the whole crop.

In spite of the absence of any base for calculation for this group of countries it would not seem too much to say that their total production will be below that of last year, both on account of conditions created directly or indirectly by the war, and as a result of meteorological conditions often none too favourable.

As regards the other European countries, available information, in some cases coming from unofficial sources, may be summarized as follows:

In Spain the crop has been greater than last year, but under average.

For Italy, the total results are about 10 % under the crop of last year; the decrease, caused in some regions, particularly in the North, by adverse weather conditions, has been only partially compensated by the good yields obtained elsewhere, notably in the southern regions.

Among the Danubian countries, Hungary and Romania have had relatively short crops, although the most recent estimates are slightly higher than the first forecasts. The season during the winter and spring was unfavourable to crops, which moreover were sown over less than normal areas.

For Bulgaria and Yugoslavia there are as yet no crop estimates; it would appear however that these are below the average. The production in Greece is

Cereal Production.

| COUNTRIES AND PRODUCTS | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | |
|---------------------------|------------------|------------|----------------------------|------------------|-------------|----------------------------|---------------|------------------|--|
| | Thousand centals | | | Thousand bushels | | | 1939 = 100 | Average = 100 | |
| WHEAT | | | | | | | | | |
| Spain | * 72,753 | 63,447 | (1) 93,264 | * 121,252 | 105,742 | (1) 155,437 | 114.7 | 78.0 | |
| Greece | 20,503 | 22,975 | 16,616 | 34,171 | 38,291 | 27,693 | 89.2 | 123.4 | |
| Hungary | (2) 50,202 | (3) 67,862 | (4) 48,933 | (2) 83,668 | (3) 113,102 | (4) 81,554 | — | — | |
| Italy | 160,938 | 175,929 | 160,487 | 268,225 | 293,210 | 267,474 | 91.5 | 100.3 | |
| Romania | 65,876 | 98,169 | 74,044 | 109,791 | 163,611 | 123,404 | 67.1 | 89.0 | |
| Canada | {(w)(s) 10,094 | 13,363 | 8,437 | (5) 16,823 | 22,271 | 14,061 | 75.5 | 119.6 | |
| | {(s) 255,349 | 280,411 | 149,630 | (5) 425,581 | 467,352 | 249,383 | 91.1 | 170.7 | |
| United States | {(w) 314,394 | 338,059 | 335,654 | 523,990 | 563,431 | 559,423 | 93.0 | 93.7 | |
| | {(s) 122,792 | 113,241 | 94,772 | 204,654 | 188,735 | 157,954 | 108.4 | 129.6 | |
| India | (6) 239,098 | 220,013 | 219,475 | (6) 398,496 | 366,688 | 365,792 | 108.7 | 108.9 | |
| RYE | | | | | | | | | |
| Spain | * 15,432 | 9,045 | (1) 10,981 | * 27,558 | 16,152 | (1) 19,608 | 170.6 | 140.5 | |
| Greece | 1,275 | 1,376 | 1,248 | 2,278 | 2,457 | 2,229 | 92.7 | 102.2 | |
| Hungary | (2) 16,874 | (3) 19,042 | (4) 15,361 | (2) 30,133 | (3) 34,004 | (4) 27,430 | — | — | |
| Romania | 6,926 | 9,513 | 8,625 | 12,368 | 16,987 | 15,401 | 72.8 | 80.3 | |
| Canada | {(w)(s) 5,864 | 6,820 | 3,065 | (5) 10,472 | 12,178 | 5,473 | 86.0 | 191.3 | |
| | {(s) 1,615 | 1,752 | 894 | (5) 2,884 | 3,129 | 1,597 | 92.2 | 180.6 | |
| United States | 20,635 | 21,979 | 23,115 | 36,848 | 39,249 | 41,276 | 93.9 | 89.3 | |
| BARLEY | | | | | | | | | |
| Spain | * 44,093 | 31,048 | (1) 48,808 | * 91,861 | 64,685 | (1) 101,684 | 142.0 | 90.3 | |
| Greece | 5,280 | 4,877 | 4,336 | 11,001 | 10,160 | 9,034 | 108.3 | 121.8 | |
| Hungary | (2) 15,823 | (3) 17,407 | (4) 13,402 | (2) 33,070 | (3) 36,265 | (4) 27,922 | — | — | |
| Romania | 24,530 | 17,999 | 22,736 | 51,106 | 37,498 | 47,367 | 136.3 | 107.9 | |
| Canada | (5) 49,899 | 49,511 | 38,880 | (5) 103,957 | 103,147 | 81,001 | 100.8 | 128.3 | |
| United States | 137,941 | 129,379 | 98,233 | 287,377 | 269,540 | 204,652 | 106.6 | 140.4 | |
| OATS | | | | | | | | | |
| Greece | 3,840 | 3,343 | 2,479 | 12,001 | 10,447 | 7,748 | 114.9 | 154.9 | |
| Hungary | (2) 9,343 | (3) 8,067 | (4) 5,944 | (2) 29,197 | (3) 25,209 | (4) 18,574 | — | — | |
| Romania | 9,920 | 10,736 | 13,140 | 30,999 | 33,548 | 41,061 | 92.4 | 75.5 | |
| Canada | (5) 130,132 | 130,698 | 110,640 | (5) 406,663 | 408,432 | 345,752 | 99.6 | 117.6 | |
| United States | 330,119 | 301,194 | 304,176 | 1,031,622 | 941,230 | 950,551 | 109.6 | 108.5 | |

(w) Winter crop. — (s) Spring crop. — * Unofficial estimate.

(1) Average 1934 to 1936. — (2) Including the reannexed northern zone and the Sub-Carpathian Russia. — (3) Including the reannexed zone but excluding the Sub-Carpathian Russia. — (4) Territory as at the end of 1937. — (5) Conjectural estimate based on crop condition on July 1 and longtime average yield. — (6) Second estimate.

expected to be abundant, but less than last year. The information relative to Turkey also forecasts an abundant harvest.

With regard to Northern Europe, information available for the Scandinavian countries as well as that for the Baltic countries, agrees in stating that during the month of June the weather was excessively dry and not very warm; the state of the crops at the beginning of July in Denmark, Estonia, Lithuania and Finland leads us to expect less than average yields or even decidedly poor ones.

On the whole it seems certain that this year's European production will be considerably less than that of 1939.

The weather conditions in the U. S. S. R., during the month of June were on the whole rather favourable to the wheat crop; the condition of the fields towards the end of the month gave hope of a satisfactory harvest in the majority of regions.

For North America, the new estimate for the production of autumn wheat arrived at by the United States Department of Agriculture based on the condition of crops on July 1, shows an increase in comparison with the estimate made in the preceding month.

The forecasted harvest does not reach the figure registered in 1939, owing to the fact that the areas on which autumn wheat is harvested this year are 10 per cent. less as compared to last year; the estimated yield is almost the same as that obtained in 1939 (about 15 bushels per acre). On the other hand, there has been an extension of the spring crop, for which production is estimated, based on the crop condition on July 1, as above that of 1939. The total production of wheat in the United States is thus estimated at around 729 million bushels, against 752 in 1939 and 717 for the 5-year average 1934/1938.

For Canada, the elements for calculation are more uncertain, since the areas effectively sown to spring wheat will not be known until next month.

The crop condition officially registered on July 1 is not as good as on the corresponding date last year, but still fairly good. Supposing that the areas effectively sown correspond to the intentions expressed by agriculturists according to an enquiry made by the Ministry of Agriculture at the beginning of May, this crop condition would allow a forecast of a total harvest of autumn and spring wheat of around 442 million bushels, a quantity less than the very abundant harvest registered in 1939 (490 million bushels), but far above those of all the other harvests obtained since 1932.

In conclusion, the information on the conditions of crops on July 1 seems to confirm for the whole of North America fairly good results, with a total of 1,170 million bushels. This total production is less than the 1939 production (1,242 million bushels) but is considerably above the average for the preceding five years (981 million bushels).

It is obvious that the course of the season up to the time of the harvest may still influence to a considerable extent the results of the spring wheat crop in Canada, as well as in the United States. During the first three weeks of July, in some regions damage has been caused by drought.

For India, no revision has been received of the second crop estimate; this estimate forecasts an excellent production, among the highest registered for this country.

CURRENT INFORMATION FROM VARIOUS COUNTRIES ON WHEAT, RYE, BARLEY AND OATS.

Denmark: The months of May and June were characterized by dry weather and there was some rain only at the end of June, and this was not general.

Owing to the severe winter frequent re-sowings have been necessary. In general the condition of cereals was bad especially for wheat.

The condition of the crops at the beginning of July, compared to that at the beginning of July 1939, was as follows: wheat: 69 (91), rye 84 (89), barley 87 (84), oats 82 (85), meslin 81 (83).

Finland: During the month of June the temperature was above the average and drought predominated above all in the south-west and in a part of the north of the country.

According to the system of the country (8 = very good; 6 = above average, and 5 = average) the state of the crops at the beginning of July was as follows: winter wheat 4.2, spring wheat 5.1, winter rye 4.3, barley 5.0, oats 5.0 and meslin 5.0.

According to the most recent information area and yield of cereals in 1939 compared with those of 1938 and the average of the five preceding years were as follows:

Area (acres).

| | 1939 | 1938 | Average 1933-1937 | 1938 = 100 | % 1939 Average = 100 |
|------------------|-----------|-----------|----------------------|---------------|----------------------------|
| Wheat | 336,340 | 322,630 | 175,500 | 104.3 | 101.7 |
| Rye | 538,600 | 583,500 | 590,700 | 92.3 | 91.2 |
| Barley | 294,000 | 298,000 | 315,900 | 98.6 | 93.1 |
| Oats | 1,166,500 | 1,143,400 | 1,140,500 | 102.0 | 102.3 |
| Meslin | 28,500 | 23,700 | 34,600 | 120.1 | 82.4 |

Production.

| | 1939 | 1938 | Average 1933-37 | 1939 | 1938 | Average 1933-37 | 1938 = 100 | % 1939 Average = 100 |
|------------------|------------------|--------|--------------------|------------------|--------|--------------------|---------------|----------------------------|
| | Thousand centals | | | Thousand bushels | | | | |
| Wheat | 5,102 | 5,642 | 2,748 | 8,503 | 9,403 | 4,579 | 90.4 | 185.7 |
| Rye | 6,736 | 8,124 | 8,187 | 12,029 | 14,507 | 14,619 | 82.9 | 82.3 |
| Barley | 4,156 | 4,572 | 4,031 | 8,658 | 9,524 | 8,399 | 90.9 | 103.1 |
| Oats | 16,935 | 18,203 | 15,171 | 52,922 | 56,883 | 47,409 | 93.0 | 111.6 |
| Meslin | 425 | 392 | 535 | 733 | 675 | 923 | 108.5 | 79.4 |

Spain: According to information published by the press the cereal crop, in spite of the efforts made by the competent authorities, has given poor results this year for wheat, owing to the probable reduction in the areas sown and to the generally unfavourable weather conditions.

The production of wheat in 1940 is unofficially estimated at 72,753,000 centals (121,252,000 bushels) against 63,447,000 (105,742,000) in 1939 and an average of 93,264,000 (155,437,000) in 1934 to 1936; percentages, 114.7 and 78.0.

The production of rye is unofficially estimated at 15,432,000 centals (27,558,000 bushels) against 9,045,000 (16,152,000) in 1939 and an average of 10,981,000 (19,608,000) in 1934 to 1936; percentages, 170.6 and 140.5.

The production of barley is unofficially estimated at 44,093,000 centals (91,861,000 bushels) against 31,048,000 (64,685,000) in 1939 and an average of 48,808,000 (101,684,000) in 1934 to 1936; percentages, 142.0 and 90.3.

Estonia: During the month of June, weather conditions were not favourable to crops; in fact the temperature was low and there was little rain; in spite of these unpropitious conditions, the state of the crop has improved as compared with that of the preceding month.

At the beginning of July, the condition of the winter wheat crop was quoted at 81 according to the system used by the Institute, and that of winter rye 91.

Greece: (Telegram of July 25): The Ministry of Agriculture has just communicated the figures of the first estimate of the production of cereals during the present year:

| | | 1940 | 1939 | Average 1934-38 | % 1940 1939 = 100 Average = 100 | |
|------------------|-------------|--------|--------|--------------------|---|-------|
| Wheat | 000 centals | 20,503 | 22,075 | 16,616 | 89.2 | 123.4 |
| | 000 bushels | 34,171 | 38,291 | 27,693 | | |
| Rye | 000 centals | 1,275 | 1,376 | 1,248 | 92.7 | 102.2 |
| | 000 bushels | 2,278 | 2,457 | 2,229 | | |
| Barley | 000 centals | 5,280 | 4,877 | 4,336 | 108.3 | 121.8 |
| | 000 bushels | 11,001 | 10,160 | 9,034 | | |
| Oats | 000 centals | 3,840 | 3,343 | 2,479 | 114.9 | 154.9 |
| | 000 bushels | 12,001 | 10,447 | 7,748 | | |

Hungary: During the fortnightly period ending on July 2, rather rainy weather prevailed. The rainfall was above the average throughout the greater part of the country. The rains were, on the whole, of a stormy nature. In many places damage to cereals by hail has been reported.

These weather conditions were not favourable to wheat or barley, the ripening of which was retarded. The wheat crops ripened during the first week of July, with the exception of those in Subcarpathia where at that time only flowering was reported. Owing to rain storms, in many places, the wheat has been beaten down, thus favouring the spread of rust on the leaves and even on the stalks.

At the beginning of the month of July, the harvesting of the rye crop was being carried out in the southern departments. The ears are on the whole big, but owing to winds during the flowering period, some ears have remained barren.

The harvesting of winter barley was also under way at the beginning of July in the southern regions. With the exception of some departments, autumn barley is low and patchy, but the ears are fairly big.

As for spring barley, that sown early is growing well in the majority of the departments, while that sown later is low and overrun by weeds.

The weather during the second half of June was very favourable to oats, particularly to those sown early.

In the following table we have collected the statistical data of the second estimate of cereal production in Hungary. It must be noted that the figures for this year refer also to the northern re-incorporated zone and to Sub-Carpathian Russia, while the figures for 1939 do not include the latter and the average refers only to Hungary as contained within the frontiers at the end of 1937.

| | | Total production | | | Yield per acre | | |
|--------------------|--------------------|------------------|---------|---------|----------------|------|---------|
| | | 1940 | 1939 | 1934-38 | 1940 | 1939 | 1934-38 |
| Wheat | (thousand centals) | 50,202 | 67,862 | 48,933 | 11.6 | 14.7 | 12.5 |
| | (" bushels) | 83,668 | 113,102 | 81,554 | 19.4 | 24.5 | 20.8 |
| Rye | (thousand centals) | 16,874 | 19,042 | 15,301 | 10.4 | 11.1 | 9.9 |
| | (" bushels) | 30,133 | 34,004 | 27,430 | 18.6 | 19.8 | 17.6 |
| Winter barley . . | (thousand centals) | 1,773 | 3,186 | 2,820 | 9.4 | 14.7 | 13.0 |
| | (" bushels) | 3,070 | 6,637 | 5,887 | 19.5 | 30.6 | 27.2 |
| Spring " . . . | (thousand centals) | 14,100 | 14,221 | 10,576 | 12.4 | 12.9 | 11.5 |
| | (" bushels) | 30,000 | 29,628 | 22,035 | 25.9 | 26.8 | 24.0 |
| Total barley . . . | (thousand centals) | 15,873 | 17,407 | 13,402 | 12.2 | 13.2 | 11.8 |
| | (" bushels) | 33,070 | 36,265 | 27,922 | 25.4 | 27.5 | 24.6 |
| Oats | (thousand centals) | 9,343 | 8,067 | 5,944 | 11.8 | 12.7 | 11.0 |
| | (" bushels) | 20,197 | 25,209 | 18,574 | 36.8 | 39.8 | 34.3 |

Italy: An official report furnishes the following information on the 1940 wheat campaign:

The wheat harvest forecast is now about 160,938,000 centals (268,225,000 bushels) as against 175,529,000 (293,210,000) in 1939, and an average of 160,487,000 (267,474,000) during the preceding five years. Percentages: 91.5 and 100.3.

Persistent rains often accompanied by frosts, had caused serious damages to wheat in northern and central Italy during the winter. In spite of that, the forecast at June 15 was for a harvest of about 168,000,000 centals (280,000,000 bushels).

Continuous rains have further increased the damage, influencing the volume of the crop and reducing the specific weight in some of the northern sections.

In Latium, southern Italy and Sicily the crop is greater than last year. This increase however does not compensate for the losses in northern Italy. The wheat campaign closes with a large reserve in storage.

Lithuania: Weather conditions featured by severe droughts, helped the work in the fields but were unfavourable to the growth of the crops. Owing to lack of rains, spring crops have made little progress.

At the beginning of July, the condition of the crops, compared with that of last year at the same date, was as follows: *winter wheat* 86.6 (123.3), *spring wheat* 93.3 (103.3), *winter rye* 110 (110), *spring rye* 86.6 (106.6), *barley* 93.3 (103.3), *oats* 93.3 (110), *meslin* 93.3 (106.6).

Norway: During the month of June the weather was in general exceptionally dry and sunny. During the day it was very hot, and, during the night relatively cold; there have even been reports of damage caused by night frosts in the south.

In the south-east and the south there has been little rain and the drought began to be alarming. In the southwest some light rainfall has averted for the moment the danger of excessive drought. Only in the Centre (Trondelag) has there been good rainfall.

Cereals had risen well and were not overrun by weeds. In the south and the south-east the crops have entered into the earing stage; the stalk is short and some damage is reported as having been caused by insects. In the Centre the condition of the cereal crops is very good.

Romania: During the first decade of July, the weather improved throughout the country and the temperature rose.

Winter wheat appeared generally in good condition with the exception of the Marea administrative region (the Sea) and parts of the Somes administrative region (beyond the Somes river), where it is rather poor. The attacks of rust and blight have not caused important damage.

Areas sown to cereals.

| COUNTRIES | 1940 | | 1939 | | Average 1934 to 1938 | | % 1940 | | 1940 | | 1939 | | Average 1934 to 1938 | | % 1940 | |
|--|-----------|--------|--------|-------|----------------------|--------|------------|---------------|-----------|-------|-------|-------|----------------------|--|------------|---------------|
| | 000 acres | | | | | | 1939 = 100 | Average = 100 | 000 acres | | | | | | 1939 = 100 | Average = 100 |
| | | | | | | | | | | | | | | | | |
| WHEAT | | | | | | | | | | | | | | | | |
| Greece | 2,636 | 2,356 | 2,072 | 111.9 | 127.2 | | | 185 | 156 | 170 | 105.4 | 96.9 | | | | |
| Lithuania w) | 346 | 364 | 381 | 94.9 | 90.7 | | | 1,248 | 1,222 | 1,246 | 102.2 | 100.1 | | | | |
| Luxembourg w) | 35 | 38 | 45 | 91.1 | 76.2 | | | 16 | 18 | 18 | 89.8 | 89.2 | | | | |
| Romania w) | 7,798 | 9,558 | 7,809 | 81.6 | 99.9 | | | 853 | 1,086 | 1,015 | 78.5 | 84.0 | | | | |
| Canada { w) 1) 711 2) 735 2) 590 | | | | 96.7 | 120.5 1) | 738 2) | 891 2) | | | 565 | 82.8 | 130.7 | | | | |
| United States { s) 1) 27,535 2) 26,021 2) 24,451 | | | | 105.8 | 112.6 3) | 209 | 211 | | | 168 | 99.1 | 124.2 | | | | |
| United States { w) 1) 34,076 2) 37,802 2) 40,498 | | | | 90.1 | 84.1 1) | 3,214 | 3,811 | | | 3,363 | 84.3 | 95.6 | | | | |
| United States { s) 1) 19,425 2) 17,532 2) 22,304 | | | | 110.8 | 87.1 1) | | | | | | | | | | | |
| India (4) | 33,666 | 34,941 | 34,585 | 96.4 | 97.3 | — | — | — | — | — | — | — | | | | |
| Egypt | 1,560 | 1,501 | 1,452 | 103.9 | 107.4 | — | — | — | — | — | — | — | | | | |
| BARLEY | | | | | | | | | | | | | | | | |
| Greece | 547 | 532 | 511 | 102.8 | 107.1 | 443 | 373 | 339 | 118.7 | 130.6 | | | | | | |
| Romania w) | 226 | 56 | 196 | 88.1 | 115.2 | — | — | — | — | — | — | — | | | | |
| Canada 3) 4,484 4,347 4,144 | | | | 103.1 | 108.2 3) | 12,880 | 12,790 | 13,435 | 100.7 | 95.9 | | | | | | |
| United States 3) 14,606 14,546 11,912 | | | | 100.4 | 122.6 3) | 35,818 | 35,512 | 38,421 | 100.9 | 93.2 | | | | | | |
| Egypt | 272 | 273 | 280 | 99.7 | 97.0 | — | — | — | — | — | — | — | | | | |
| OATS | | | | | | | | | | | | | | | | |

w) Winter crops. — s) Spring crops. — 1) Area indicated for harvest. — 2) Area harvested. — 3) Farmers' intentions to plant. — 4) Fourth estimate.

Spring cereals appear to be in very good condition, particularly barley and oats. By the middle of July, wheat harvesting was almost finished in the Danube valley. In some places, the yields are higher than those forecast before harvesting.

On the basis of the condition of the crops at the beginning of June, the first cereal production estimate (including Bessarabia and Northern Bucovina) is as follows: Wheat

65,876,000 centals (109,791,000 bushels) against 68,169,000 (163,611,000) in 1939 and: 74,044,000 (123,404,000) for the average 1934-38 (67.1 and 89.0 per cent.); rye: 6,926,000 centals (12,368,000 bushels), against 9,513,000 (16,987,000) and 8,625,000 (15,401,000) for the average 1934-38 (72.8 and 80.3 per cent.); barley: 24,530,000 centals (51,106,000 bushels), against 17,999,000 (37,498,000) and 22,736,000 (47,367,000) (136.3 and 107.9 per cent.) and oats: 9,920,000 centals (30,999,000 bushels), against 10,736,000 (33,548,000) and 13,140,000 (41,061,000) (92.4 and 75.5 per cent.).

Switzerland: The first half of June was featured by weather conditions favourable to crops in general, while in the second fortnight damp and warm weather prevailed.

For autumn cereals, thinly-sown fields overrun by weeds are observed. However, these crops have recovered well. Some fields which seemed extremely patchy in the spring now show an almost normal condition owing to the favourable weather. As a result of the abundant rainfall, a good yield of straw may also be expected. Spring cereals show a luxuriant growth. Spring wheat, barley and oats give promise of a very good harvest.

The following is a table of crop conditions prepared, according to the system in use in the country, on a basis of an abundant crop = 100:

| | 1-VII-1940 | 1-VI 1940 | 1-VII-1939 |
|-------------------------|------------|-----------|------------|
| Autumn wheat | 68 | 61 | 81 |
| Spring wheat | 77 | 72 | 76 |
| Autumn rye | 72 | 67 | 81 |
| Spring rye | 79 | 70 | 76 |
| Autumn barley | 70 | 64 | 83 |
| Spring barley | 80 | 74 | 78 |
| Oats | 81 | 77 | 77 |
| Meslin | 76 | 66 | 83 |
| Spelt | 74 | 67 | 82 |

Yugoslavia: Official figures on the harvest of cereals in the present year are still lacking. According to private sources the wheat harvest appears to be inferior to the abundant harvests of the two preceding years, not only because the situation of the crops varies widely from one region to another, but also on account of the reduction of the areas sown to wheat in consequence of the heavy cold of the winter and of floods in different zones during springtime.

By a decree of June 24 the price of wheat has been set at from 224 to 230 dinars per quintal. This price is about 12 per cent. lower than regular market prices. The same decree sets also the amounts of wheat which the producer is allowed to hold for his own needs. The other part of the harvest must be declared and put at the disposal of the "Société privilégiée pour les exportations des produits agricoles" in case it wishes to buy it.

U. R. S. S.: In the first decade of June the temperature was from 2 to 4 degrees below normal in the European part of the Union, in the northern zone and in some regions of the central zone where frosts occurred. Abundant rains, often of a stormy

character, fell nearly everywhere, except in the northern section of Ukraine, the regions of Voroshilovgrad and Rostov, a section of the regions of the lower Volga and of Kasakstan. Abundant rains fell also in Siberia.

Cold wheather prevailed in the European part of the Union also in the second decade of June. Abundant rains fell in the Crimea, in northern Caucasus, in the regions of Rostov, Stalingrad, Saratov, Tambov, Penza, Konybichef and other northern sections. In the north-western and in the central zones rain was scarce, and in White Russia and in the greatest part of Ukraine it lacked altogether.

Thanks to rains, the conditions of the crops improved. In White Russia and Ukraine the soil water reserves were still sufficient for the normal growth of the cereals.

At the beginning of the third decade of June the situation of winter cereals was as follows: good or very good for *winter rye* nearly everywhere except in some central regions (Riazan, Toula, Leningrad and Gorki), where it was satisfactory or unsatisfactory. The situation of *winter wheat* was excellent in the Crimea, very good in the Caucasus with the exception of the Kuban region where the growth was damaged by pests. In Ukraine, it was generally good, while in the central regions the crop was only satisfactory or even poor.

Spring cereals were rapidly growing, with rains falling abundantly. In the majority of the regions, metereological conditions were favourable to their development. *Spring wheat* was growing well nearly everywhere; in some regions (Voroshilovgrad and the south-eastern part of Voroneje) its growth was only satisfactory.

Barley was growing excellently in the Crimea and well in Ukraine. *Oats* promised well everywhere.

In the Asiatic territory of the Union the wheather was very warm in the second decade of June and the very high temperature during the blooming phase was very damaging to the growth of rye. The soil water reserves were sufficient for a normal development of the crops. In Siberia the *rye* crop was good and that of the *spring wheat* varied generally from good to satisfactory. In central Asia the harvest of the *winter wheat* had begun. In Kasakstan winter wheat was nearly mature and its situation varied from good to satisfactory.

During the third decade of June sunny warm wheather prevailed nearly everywhere. There were some heavy rainstorms in some regions of northern Caucasus and Ukraine. This year harvesting began later than last year and will last less. It will also be more complicated on account of the laying of cereals in some zones over rather considerable sections.

Canada: The crop condition of cereals on July 1 was as follows:

| | 1-VII-1940 | 1-VII-1939 |
|------------------------|------------|------------|
| Winter wheat | 99 | 98 |
| Spring wheat. | 92 | 102 |
| Winter rye. | 86 | 92 |
| Spring rye. | 92 | 100 |
| Barley | 92 | 96 |
| Oats | 92 | 98 |

The above figures show that, with the exception of winter wheat the crop condition of which was nearly the same as on July 1, 1939, the condition of all cereals and particularly that of spring wheat (which represents almost the whole wheat crop) was on July 1, 1940 less favourable than last year at the same date.

On the basis of area sown, crop condition on July, and longtime average yields, approximate estimates of the cereal production may be arrived at as follows.

| | 1940 | 1939 | Average 1934-38 | % 1939 = 100 | % 1940 Average = 100 |
|------------------------|---------------|---------|--------------------|--------------------|-------------------------------|
| | (000 centals) | | | | |
| Winter wheat | 10,094 | 13,363 | 8,437 | 75.5 | 119.6 |
| Spring wheat | 255,349 | 280,411 | 149,630 | 91.1 | 170.7 |
| Winter rye | 5,864 | 6,820 | 3,065 | 86.0 | 191.3 |
| Spring rye | 1,615 | 1,752 | 894 | 92.2 | 180.6 |
| Barley | 49,899 | 49,511 | 38,880 | 100.8 | 128.3 |
| Oats | 130,132 | 130,698 | 110,640 | 99.6 | 117.6 |
| | (000 bushels) | | | | |
| Winter wheat | 16,823 | 22,271 | 14,061 | 75.5 | 119.6 |
| Spring wheat | 425,581 | 467,352 | 249,383 | 91.1 | 170.7 |
| Winter rye | 10,472 | 12,178 | 5,473 | 86.0 | 191.3 |
| Spring rye | 2,884 | 3,129 | 1,597 | 92.2 | 180.6 |
| Barley | 103,957 | 103,147 | 81,001 | 100.8 | 128.3 |
| Oats | 406,663 | 408,432 | 345,752 | 99.6 | 117.6 |

It may be said therefore that the production of all cereals, although being slightly below that of last year (except for barley and oats the crop of which is expected to be nearly equal to that of 1939), will be considerably above the average.

United States: During the week ending June 30, in the east the weather was on the whole cool, but in the west it was warm. In the southwest there was abundant rainfall and everywhere else sudden showers.

Harvesting was continued in the Central States, with some interruptions caused by rain.

During the week ending July 7, the weather was on the whole cool and rainy in the east and south, dry and warm in the northwest and west.

The winter wheat harvest has been effected under good conditions. In many regions spring wheat has suffered some damage from prolonged heat and drought.

(Telegram of July 18): The work of harvesting winter wheat has been continued actively during the last week. In some regions sown to spring wheat there are complaints of new damage caused by drought, particularly in the northwestern Pacific zone.

(Telegram of July 26): The harvest and threshing of wheat are being effected under good conditions.

According to recent information, we give below the last figures of cereal production for 1940.

| | 1940 | 1939 | Average 1934-38 | % 1940 1939 = 100 | Average = 100 |
|------------------------|---------------|---------|--------------------|-------------------------|------------------|
| | (000 centals) | | | | |
| Winter wheat | 314,394 | 338,059 | 335,654 | 93.0 | 93.7 |
| Spring wheat | 122,792 | 113,241 | 94,772 | 108.4 | 129.6 |
| Total | 437,186 | 451,300 | 430,426 | 96.9 | 101.6 |
| Rye | 20,635 | 21,979 | 23,115 | 93.9 | 89.3 |
| Barley | 137,941 | 129,379 | 98,233 | 106.6 | 140.4 |
| Oats | 330,119 | 301,194 | 304,176 | 109.6 | 108.5 |
| | (000 bushels) | | | | |
| Winter wheat | 523,990 | 563,431 | 559,423 | 93.0 | 93.7 |
| Spring wheat | 204,654 | 188,735 | 157,954 | 108.4 | 129.6 |
| Total | 728,644 | 752,166 | 717,376 | 96.9 | 101.6 |
| Rye | 36,848 | 39,249 | 41,276 | 93.9 | 89.3 |
| Barley | 287,377 | 269,540 | 204,652 | 106.6 | 140.4 |
| Oats | 1,031,622 | 941,230 | 950,551 | 109.6 | 108.5 |

Turkey: According to reports received from the principal cereal producing regions, the forecasts for the coming harvest are more or less satisfactory. The abundant rainfall towards the end of June greatly favoured the growth of the crops. In order to ensure a successful harvesting, the Turkish government has distributed to farmers a large quantity of machines and harvesting equipment.

CURRENT INFORMATION ON MAIZE.

Hungary: The rainy and cool weather of the second half of June was not favourable to the maize crop. The warmer weather at the beginning of the month of July was very favourable to the crop. The early-sown crop is in good condition and, in the southern regions, the panicles are formed. The second weeding was under way at the beginning of July. The late-sown crops show little growth, particularly on the lower and damper land: the crops are yellow and badly overrun by weeds.

On July 2, the condition of the maize crop was above the average in 14 departments, average in 17 departments and below the average in the remaining 3 departments.

Italy: The maize crop is expected to be very abundant owing to favourable weather conditions and to frequent rains which have helped the growth of the crops.

Romania: At the end of the first decade of the month of July, maize which had been sown early and weeded in good time was in very good condition. Unweeded maize and that on land where rainwater is stagnant is poor.

According to the first official estimate, the area of maize this year (including Bessarabia and Northern Bucovina) amounts to 12,819,000 acres, against 12,187,000 in 1939 and 12,648,000 for the average of the years 1934-38 (105.2 and 101.4 per cent.).

Yugoslavia: Weather conditions during the second half of June and the first half of July have been generally favourable to the maize crop.

United States: During the week ending June 30 maize crops were in need of warm and dry weather.

According to the most recent estimate area cultivated to maize this year is about 86,306,000 acres against 90,734,000 in 1939 and 93,428,000 on the average of the five years ending 1938; percentages 95.1 and 92.4. The corresponding production is estimated at about 1,353 million centals (2,416 million bushels) against 1,451 (2,591) and 1,174 (2,097); percentages 93.2 and 115.2.

(Telegram of July 26): In the western regions of the maize zone, particularly in Kansas, damage has been caused by excessive heat and drought; in the other sections the situation of maize was generally very good.

CURRENT INFORMATION ON RICE.

Italy: Owing to favourable meteorological conditions and frequent rains the rice crop is expected to be exceptionally good.

Romania: The area under rice in 1940 (including Bessarabia and North-Bucovina) is estimated at 1,060 acres against 1,100 acres in 1939 and 930 acres in 1938; percentages, 96.4 and 114.4.

United States: According to the most recent estimate area cultivated to rice this year is about 1,095,000 acres against 1,042,000 in 1939 and 955,000 on the average of the five years ending 1938; percentages 105.1 and 114.7. The corresponding production is estimated at about 24,420,000 centals (54,267,000 bushels) against 23,492,000 (52,204,000) and 21,078,000 (46,839,400); percentages 104.0 and 115.9.

Uruguay: The rice production for 1939-40 is officially estimated at about 489,000 centals (1,086,000 bushels) as against 472,000 centals (1,050,000) produced in 1938-39 and 291,000 centals (646,000) representing the average crop during the previous five years; ratios 103.4 and 168.2. This year's crop is exceptionally abundant and it will be possible to export some 170,000 centals (377,000) after providing amply for home requirements.

CURRENT INFORMATION ON POTATOES.

Denmark: The condition of the crop on July 1 was quoted at 89 as against 94 on the corresponding date last year.

Finland: The planting of potatoes has been effected under good conditions and at the beginning of July the condition of the crop was quoted at 5.2 according to the system of the country.

Area cultivated to potatoes in 1939 was 222,900 acres against 210,900 in 1938 and 207,600 on the average of the five years ending 1937; percentages 105.7 and 107.4. The corresponding production is estimated at about 29,308,200 centals (48,846,100 short tons) against 26,408,700 (44,013,600) and 28,706,800 (47,843,700); percentages 111.0 and 102.1.

Hungary: At the beginning of the month of July, the potatoes were growing very well and they were in flower. The formation of the tubers is good.

On July 2, the condition of the potato crop was above the average in the majority of departments.

Italy: Owing to very favourable wheather conditions, the potato crop is expected to be quite abundant.

Lithuania: The condition of the crop at the beginning of July was quoted at 110 as against 113.3 at the same date last year.

Norway: Potatoes are in good condition everywhere, but are in need of rain to develop well.

Romania: At the beginning of June the potato crop condition was average.

The area under potatoes in 1940 including Bessarabia and North Bucovina is estimated at 575,300 acres against 512,200 acres in 1939 and an average of 512,000 acres in 1934 to 1938; percentages, 112.3 and 112.4.

Switzerland: Potato crops are extraordinarily well developed. They present a good appearance everywhere and give promise of a heavy yield, if the weather conditions remain propitious. Owing to the stormy weather towards the end of the month of June, anticryptogamic measures must be undertaken.

The condition of the potato crop at the beginning of July was quoted, according to the system of the country, at 85, against 78 on June 1, 1940, and 64 on July 1, 1939.

U. R. S. S.: At the 15th of June in the collective exploitations which represent about one half of all the surfaces sown to potatoes in the country, had been planted 7,023,000 acres, *i. e.*, 80 per cent. of the amount foreseen by the plan, as against 7,527,000 *i. e.*, 91 per cent. of the plan, planted at the same date last year.

Towards the middle of June the potato crop was generally satisfactory in the central regions and good in the Black Lands and Ukraine.

Argentina: Potato lifting during the 1939-40 season has given generally good results in the province of Buenos Ayres, Santiago del Estero, Jujuy, and mediocre in the provinces of Mendoza and San Juan. Good yields are expected for the late varieties in the provinces of Santa Fé and Cordoba.

United States: According to the most recent estimate area cultivated to potatoes this year is about 3,087,000 acres against 3,027,000 in 1939 and 3,282,000 on the average of the five years ending 1938; percentages 102.0 and 94.1. The corresponding production is estimated at about 222,758,000 centals (371,263,000 bushels) against 218,410,000 (364,016,000) and 227,263,000 (378,772,000); percentages 102.0 and 98.0.

Uruguay: Forecasts for the potato crop are on the whole satisfactory.

THE SUGAR BEET CROP IN EUROPE AND SUGAR PRODUCTION

On the whole the sugar beet crop in Europe appears satisfactory in spite of adverse meteorological conditions.

According to data sent to the International Institute of Agriculture, the areas sown to sugar-beets in Europe, including the Soviet Union, are 6 per cent above the areas sown in 1939 and 14 per cent. above the average of the quinquennium 1934-1938.

If meteorological conditions remain normal till reaping time, the sugar-beet unit-yield should give a sugar beet crop at least equal to that of last year and considerably above the average, provided no damages caused by other agents should affect the results.

Acreage of Sugar-beet.

* Approximate data. — (a) Not including U. S. S. R. — (b) Including U. S. S. R. — (r) Licht's estimate. — (2) Average of two years.

of transportation were insufficient or lacking altogether owing to requisitions of carts and draft animals or to the lack of motor oil. Not all the beets will be gathered at the proper time, and the lack of transportation-means will prevent their being taken to the factories. Many factories were destroyed and those that were only damaged will have to limit their sugar output and send part of the sugar beet to other undamaged factories. Even so, part of the crop will be lost.

We will not try to measure the effects of the war on the degree of efficiency of factories and refineries. We will simply mention the transfer of the control of sugar factories and refineries from one state to another from the first of September 1939 till the present date. But this indication will suffice to show to our readers how these changes will affect at least for some time, the efficiency of factories

Production of Cane-Sugar.

| COUNTRIES | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | % 1939-40 | |
|--------------------------------|----------------|----------------|--|-------------------|-------------------|--|------------------|------------------|
| | ooo centals | | | short tons | | | 1938-39 = 100 | Average = 100 |
| AMERICA. | | | | | | | | |
| Antigua | 304 | 493 | 514 | 15,200 | 24,640 | 25,688 | 62 | 59 |
| Argentina | 11,442 | 10,244 | 8,147 | 572,000 | 512,190 | 407,341 | 112 | 140 |
| Barbados | 2,228 | 3,502 | 2,517 | 111,391 | 175,114 | 125,850 | 64 | 88 |
| Brazil | 26,235 | 24,251 | 23,161 | 1,310,000 | 1,200,000 | 1,158,050 | 108 | 113 |
| Cuba | 62,567 | 61,730 | 57,752 | 3,128,000 | 3,100,000 | 2,887,585 | 101 | 108 |
| Ecuador | 507 | 483 | 413 | 25,000 | 24,109 | 20,657 | 105 | 123 |
| United States (La. & Fl.) | 10,582 | 11,660 | 7,196 | 530,000 | 583,000 | 359,800 | 91 | 147 |
| British Guiana | 4,299 | 4,239 | 3,978 | 215,000 | 211,954 | 198,899 | 101 | 108 |
| Surinam | 245 | 270 | 378 | 12,240 | 13,499 | 18,895 | 91 | 65 |
| Jamaica | 2,538 | 2,642 | 2,086 | 126,900 | 132,100 | 104,287 | 97 | 122 |
| Martinique | 1,323 | 1,433 | 1,104 | 70,000 | 72,000 | 55,206 | 92 | 120 |
| Mexico | 6,834 | 7,772 | 6,037 | 340,000 | 388,602 | 301,854 | 88 | 113 |
| Peru | 8,686 | 8,157 | 8,702 | 434,000 | 410,000 | 435,102 | 106 | 100 |
| Puerto Rico | 22,046 | 17,042 | 18,515 | 1,000,000 | 852,000 | 925,750 | 129 | 119 |
| Dominican Republic | 9,921 | 9,502 | 9,030 | 500,000 | 475,000 | 451,494 | 104 | 110 |
| St. Kitts | 626 | 836 | 659 | 31,300 | 41,816 | 32,944 | 75 | 95 |
| St. Lucia | 220 | 180 | 168 | 11,000 | 9,016 | 8,424 | 122 | 130 |
| Trinidad | 2,866 | 2,877 | 2,983 | 140,000 | 143,870 | 149,129 | 100 | 96 |
| Venezuela | 551 | 540 | 489 | 28,000 | 27,000 | 24,472 | 102 | 113 |
| <i>Total America</i> | <i>174,020</i> | <i>167,853</i> | <i>153,829</i> | <i>8,600,031</i> | <i>8,395,901</i> | <i>7,691,410</i> | <i>104</i> | <i>113</i> |
| ASIA. | | | | | | | | |
| Taiwan | 26,630 | 33,671 | 19,895 | 1,331,500 | 1,683,500 | 994,719 | 79 | 134 |
| India | 61,112 | 55,213 | 59,190 | 3,056,000 | 2,760,600 | 2,959,455 | 111 | 103 |
| Japan | 3,386 | 3,596 | 2,359 | 169,300 | 179,800 | 117,951 | 94 | 144 |
| Java | 34,172 | 34,392 | 19,839 | 1,710,000 | 1,720,000 | 991,927 | 99 | 172 |
| Philippines | 24,912 | 22,708 | 23,455 | 1,230,000 | 1,140,000 | 1,172,739 | 110 | 106 |
| <i>Total Asia</i> | <i>150,212</i> | <i>149,580</i> | <i>124,738</i> | <i>7,516,800</i> | <i>7,483,900</i> | <i>6,236,791</i> | <i>100</i> | <i>120</i> |
| AFRICA. | | | | | | | | |
| Egypt | 3,524 | 3,573 | 3,179 | 176,200 | 178,634 | 158,951 | 99 | 111 |
| Mauritius | 5,059 | 7,084 | 5,886 | 252,930 | 354,180 | 294,310 | 71 | 86 |
| Reunion | 1,622 | 1,890 | 1,745 | 81,100 | 94,505 | 87,267 | 86 | 93 |
| Union of South Africa | 11,623 | 11,616 | 9,426 | 581,100 | 580,800 | 471,280 | 100 | 123 |
| <i>Total Africa</i> | <i>21,828</i> | <i>24,163</i> | <i>20,236</i> | <i>1,091,330</i> | <i>1,208,119</i> | <i>1,011,808</i> | <i>90</i> | <i>108</i> |
| OCEANIA. | | | | | | | | |
| Australia | 20,172 | 18,437 | 15,933 | 1,009,000 | 921,900 | 796,647 | 109 | 127 |
| Hawaii | 19,268 | 19,401 | 18,961 | 963,000 | 970,000 | 948,051 | 99 | 102 |
| Fiji Islands | 2,657 | 2,654 | 2,912 | 132,800 | 132,700 | 145,602 | 100 | 91 |
| <i>Total Oceania</i> | <i>42,097</i> | <i>40,492</i> | <i>37,806</i> | <i>2,104,800</i> | <i>2,024,600</i> | <i>1,890,300</i> | <i>104</i> | <i>111</i> |
| TOTALS | 388,157 | 382,088 | 336,609 | 19,312,961 | 19,112,520 | 16,830,309 | 102 | 115 |

(1) Approximate data.

and refineries. Poland had 61 sugar factories. After the German and Russian occupation, 47 of these factories passed under the control of Germany and 14 under the Soviet Union. In Finland the newly-built Vjipuri factory was taken over by the Soviet Union; the other two factories and four refineries remained in the hands of Finland. Norway is one of the very few countries that does not produce any sugar, and has neither factories nor refineries. Sugar factories and refineries in Belgium and Holland are now within the territory occupied by Germany. Of them, 16 factories (of which 4 are inactive) and 6 refineries (of which 2 are inactive) are in Holland; and 26 factories, 4 refineries and 5 factories of refined sugar are in Belgium.

The greatest part of the sugar factories and refineries in France are in the northern part of the country and in zones where the war raged most furiously. It is therefore impossible at the present time, to say anything about their state of efficiency. Of the 110 sugar factories in France, 4 near Clermont Ferrand and 2 near Avignon are on unoccupied territory.

Of the 15 sugar factories and refineries of the Kingdom of Romania, 5 passed under Soviet control: 3 of which were located in Bucovina and 2 in Bessarabia.

CURRENT INFORMATION ON SUGAR.

Denmark: The condition of the sugar-beet crop on July 1 was quoted at 94 as against 100 on the corresponding date last year.

Hungary: At the beginning of the month of July sugar beets were growing very well. Their third weeding was being carried out.

On July 2, the condition of the sugar-beet crop was above the average in the majority of departments.

Lithuania: Like all weeded crops in general, sugar beets have suffered heavily from droughts. There was some improvement at the end of June following some rains. Sugar leats crops at the beginning of July were quoted at 93.3 as against 100 at the same date last year.

Romania: At the beginning of June the sugar-beet crop condition was average. The area under sugar-beet in 1940 (including Bessarabia and North-Bucovina) is estimated at 138,600 acres against 131,900 acres in 1939 and an average of 89,100 acres in 1934 to 1938; percentages, 105.1 and 155.5.

Switzerland: The condition of the sugar-beet crop appears good to very good; it was quoted at the beginning of July, according to the system of the country, at 80 as against 77 on June 1, 1940 and 76 on July 1, 1939.

U. R. S. S.: In the principal zones where sugar beets are produced, climatic conditions in the month of June were, on the whole, favourable to the vegetation. Work is being carried on rather slowly this year. Up to June 20 weeding had been

done on 89 per cent. of the sown surface, and the control on 12 per cent. The corresponding figures in 1939 are 92.91 and 60 per cent.

Damage done this year to the sugar beet crop by parasites has been very serious, in spite of energetic measures taken nearly everywhere to combat the pest. In some zones the surfaces re-sown to sugar beets have been large.

Argentina: The excess of moisture in the soil and the low temperatures have considerably hindered the development of sugar cane in the province of Tucuman which is the main sugar-producing centre of the country. The forecasts for the cane crop in the other provinces remain good.

United States: According to the most recent estimate, area cultivated to sugar beet this year is about 913,000 acres against 937,000 in 1939 and 799,000 on the average of the five years ending 1938; percentages 97.4 and 114.3. The corresponding production is estimated at about 200,380,000 centals (10,019,000 short tons) against 215,460,000 (10,773,000) and 179,416,000 (8,971,000); percentages 93.0 and 111.7.

CURRENT INFORMATION ON VINES.

Greece: The situation of vines appears, on the whole, very satisfactory, with the exception of some slight damage caused by « peronospora » in some districts. A very satisfactory vintage is expected.

Hungary: The rainy weather of the second half of June was unfavourable to the flowering of vines. The warmer days at the beginning of July lessened the spread of peronospora.

Romania: The condition of vines was unsatisfactory about July 10th, frequent attacks of mildew having been registered.

Switzerland: The favourable weather during June greatly stimulated the growth of vines. The harvesting prospects are slightly improved as compared to May, and fairly good yields may be expected throughout the country as a whole. The condition of the crop on July 1 was quoted, according to the system of the country, at 65, as against 64 on June 1, 1940 and 74 on July 1, 1939.

Argentina: The production of grapes for wine was mediocre in the provinces of Mendoza, San Juan, Santa Fé, Cordoba, Jujuy and good in the provinces of Catamarca, La Rioja and Salta. In the valley of Rio Negro, in spite of the very considerable damage caused to the vines by frost and disease, the grape production has exceeded that of last year.

CURRENT INFORMATION ON OLIVES.

Argentina: Olive gathering in the provinces of San Juan and Mendoza has given results below the average, owing to damage caused to the trees by frosts.

CURRENT INFORMATION ON FLAX.

Finland: Area cultivated to flax and hemp in 1939 was about 6,330 acres against 7,440 in 1938 and 10,730 on the average of the five years ending 1937; percentages 85.0 and 58.9. The corresponding production of flax is estimated at about 18,460 centals against 22,190 and 33,360; percentages 83.2 and 55.3.

Hungary: The sowings of winter flax have been destroyed to a great extent by the severe winter. Spring sowings were growing well at the beginning of the month of July. In some places flax is low and overrun by weeds.

According to the most recent estimate area cultivated mainly for fibre this year is about 11,500 acres against 10,100 in 1939 and 8,100 on the average of the five years ending 1938. The corresponding fibre production is estimated at about 57,900 centals against 48,200 and 31,600. Area cultivated mainly for seed this year is about 19,900 acres against 19,600 in 1939 and 21,200 on the average of the five years ending 1938. The corresponding seed-production is estimated at about 131,100 centals against 150,900 and 121,100.

It must be noted that the above sets of figures are not comparable to one another, since those for 1940 refer also to the re-incorporated northern zone and Subcarpathia, those of 1939 do not include Subcarpathia and the average refers to Hungary as contained within the frontiers established at the end of 1937.

Lithuania: The flax crop suffered heavily from droughts. The conditions of the crop at the beginning of July were quoted at 93.3 as against 90.6 at the same date last year.

Romania: At the beginning of June the flax crop condition was average.

The area under flax in 1940 (including Bessarabia and North-Bucovina) is estimated at 46,800 acres against 30,000 acres in 1939 and an average of 60,400 acres in 1934 to 1938; percentages, 155.8 and 77.5.

U. R. S. S.: At the middle of June the plan of sowing in the collective exploitations which represent the totality of the culture of flax of the Dolgometz variety in the Union had been effected for 99.8 per cent. as against 99.4 per cent. at the same date last year. Assuming that the sowing plan will be effected wholly, the surface sown to flax this year would amount to 4,440,800 acres, as against 4,415,000 in 1939 and an average of 5,126,000 in the preceding quinquennium; percentages 100.6 and 86.6. In the principal regions where flax is cultivated, the temperature in the first two decades of June was lower than normal, while during the third decade warm weather prevailed. In some zones (White Russia) the weather was rather dry during the second and third decades of June. The work of the cultivation of flax is advancing more slowly this year than last. At the 20th of June only 29 per cent. of the sown surfaces had been weeded, as against 47 per cent. at the corresponding date last year.

Argentina: The last official report fixed the production of linseed obtained in 1939-1940 in this country at 22,364,000 centals (39,935,000 bushels). The final figure for the 1938-39 production is 31,085,000 centals (55,510,000) and the figure for the average

production for the five preceding seasons 38,106,000 (68,047,000). The production of the 1939-40 season has therefore decreased by 28.1 per cent. as compared to the 1938-39 production and by 41.3 per cent. as compared to the average.

On the other hand, the area sown in 1939-40, given as 7,600,000 acres, exceeds that of 1938-39 by 15.0 per cent. and that of the average for the preceding quinquennium by 2.2 per cent. The exceptionally low yields of the 1939-40 season [are] due to the considerable damage caused to the crop by excessive rainfall, frosts and insect attacks.

Canada: The crop condition of flax on July, was 92, that is slightly less favourable than last year on the same date when it was 94. Nevertheless, as the area under flax has been increased, a larger production than in 1939 is expected. In fact, the estimate of the linseed crop based on the condition on July 1 is 1,587,000 centals (2,834,000 bushels) against 1,215,000 (2,169,000) in 1939 and 717,000 (1,281,000) on the average of the preceding five years. Percentages: 130.6 and 221.2.

United States: According to the most recent estimate area cultivated to flax crops this year is about 3,168,000 acres against 2,034,000 in 1939 and 1,217,000 on the average of the five years ending 1938; percentages 155.8 and 260.2. The corresponding production of linseed is estimated at about 16,129,000 centals (28,801,000 bushels) against 9,766,000 (17,439,000) and 4,558,000 (8,130,000); percentages 165.2 and 353.0.

CURRENT INFORMATION ON COTTON.

Greece: Owing to unfavourable weather conditions, the areas sown to cotton this year are inferior to the figure which had been forecast. They amount to 187,000 acres, as against 190,000 sown in 1939 and 141,000 the average during the preceding five years.

Italy: During the present season, the cultivation of cotton in Italy has been considerably increased. In fact for 1940 an area almost double that of 1939 is estimated. Sowing took place under favourable weather conditions and at the end of June the production was forecasted as good and abundant.

Romania: In compliance with the policy of the Romanian Government tending towards an increase in the cultivation of textile crops, the area sown to cotton this year (including Bessarabia and North Bucovina) touched the record figure of 66,400 acres as against 17,400 in 1939 and 4,800 acres representing the average for the years from 1934 to 1938.

Crop condition was average at the beginning of June.

U. R. S. S.: In Ukraine and in the northern part of Caucasus the temperature during the first two decades of June has been lower than normal and rains were rather heavy. During the third decade the weather has been warm and dry. In central Asia dry and warm wheater had prevailed in June. The water reserves of the springs which feed the irrigation canals in central Asia are low. Measures are now being taken for a better utilisation of the water in order to be able to fill the needs of the cultures.

United States: The area under cotton on July 1, 1940 was estimated at 25,077,000 acres against 24,683,000 acres on July 1, 1939, and an average of 29,132,000 acres on July 1, 1934 to 1938; percentages: 101.6 and 86.1.

During the week ending June 30, the crops were in need of warm and dry weather.

During the first half of July the weather was in general too cool and damp for cotton growth.

Towards the end of July, warmer weather favoured the growth of cotton.

CURRENT INFORMATION ON HEMP.

Hungary: Hemp was developing well at the beginning of July. It was fairly high and thick and flowering in some places.

According to the most recent estimate area cultivated mainly for fibre this year is about 34,000 acres against 31,500 in 1939 and 27,500 on the average of the five years ending 1938. The corresponding fibre production is estimated at about 234,600 centals against 245,600 and 186,400.

Area cultivated mainly for seed this year is about 6,000 acres against 4,100 in 1939 and 3,400 on the average of the five years ending 1938. The corresponding production of seed is estimated at about 30,100 centals against 25,500 and 18,500.

It must be noted that the above sets of figures are not comparable to one another, since those for 1940 refer to the re-incorporated northern zone and to Subcarpathia those for 1939 do not include Subcarpathia, and the average refers to Hungary as contained within the frontiers at the end of 1937.

Romania: At the beginning of June the hemp crop condition was average. The area under hemp in 1940 (including Bessarabia and North-Bucovina) is estimated at 133,600 acres against 142,900 acres in 1939 and an average of 120,700 acres in 1934 to 1938; percentages, 93.5 and 110.7.

U. R. S. S.: At the middle of June the surface sown to hemp in the collective exploitations was 1,075,400 acres, *i. e.*, 81 per cent. of the figure foreseen by the plan, as against 1,193,800 acres, *i. e.*, 92 per cent. of the plan, sown last year at the same date. At the 20th of June the weeding had been effected on a surface of 234,300 acres.

Argentina: The production of hemp during 1939/40 exceeded that of the preceding season. The production is of good quality.

CURRENT INFORMATION ON TOBACCO.

Hungary: At the beginning of the month of July, tobacco was growing well and the first weeding was begun.

U. S. S. R. In Kolkhozi in which about nine-tenths of the tobacco area is cultivated in the Union, 209,000 acres of yellow-leaf tobacco, or 93 per cent. of the Plan, had been sown on June 15, against 210,800 of 98 per cent. at the same date.

last year. For the "Makhorka" variety the corresponding figures are as follows: 134,000 acres, or 60 per cent., and 152,000 or 70 per cent.

Argentina: The tobacco production for the 1939/40 season has been somewhat abundant in the main producing centres of the country, with the exception of the province of Cordoba where the yields obtained have been barely mediocre.

Production has been estimated recently at 38,718,000 pounds, against 40,490,000 pounds obtained in 1938/39 and 29,711,000 pounds for the average of the preceding quinquennium; percentages 95.6 and 130.3.

United States: According to the most recent estimate area cultivated to tobacco this year is about 1,437,000 acres against 2,014,000 in 1939 and 1,501,000 on the average of the five years ending 1938; percentages 71.4 and 95.7. The corresponding production is estimated at about 1,291,685 thousand lb. against 1,848,654 and 1,294,694; percentages 69.9 and 99.8.

CURRENT INFORMATION ON HOPS.

Hungary: On about July 2, hops were growing well. The branches are fairly long.

United States: According to the most recent estimate area cultivated to hops this year is about 33,000 acres against 31,200 in 1939 and 34,500 on the average of the five years ending 1938; percentages 105.8 and 95.7. The corresponding production is estimated at about 39,868,000 lb. against 38,570,000 lb. and 40,029,000 lb.; percentages 103.4 and 99.6.

CURRENT INFORMATION ON OTHER PRODUCTS:

Coffee.

Brazil: In June crop condition on the coffee plantations was on the whole good throughout most of the coffee growing States in the country. The "Departamento Nacional do Café" states that, as of June 15 last, the total amount of coffee destroyed in Brazil since 1931 amounted to 91,113,000 centals.

Venezuela: Last official report confirms for the season 1939-40 a coffee production rather abundant which exceeds distinctly the short crop for the previous season and about 8 % the average annual production for the preceding five years.

Situation of plantations in June was considered good in the country as a whole.

Philippines: Recent official estimates confirm that the 1939-40 coffee crop is slightly larger than that obtained last season (1938-39).

Angola: The latest official report states that an average yield of coffee was obtained in 1939-40. Conditions on the plantations were still good in May.

Groundnuts.

Argentina: Groundnut threshing in the province of Santa Fé has given good results. The yields obtained in the principal producing centres of the province of Cordoba have been satisfactory. The rainfall during the harvesting of the late varieties has reduced the anticipated yields in the provinces of Entre Rios, Tucumán and Corrientes.

Colza and Sesame.

Hungary: At the beginning of July colza harvesting was completed in many places. The crop is patchy, low and overrun by weeds. This year's production is bad, being estimated at 38,500 centals (77,000 bushels) against 242,000 (483,000) in 1939 (15.9 per cent.).

Romania: At the beginning of June the colza crop condition was average.

The area under colza in 1940 (including Bessarabia and North- Bucovina) is estimated at 113,800 acres against 151,200 acres in 1939 and an average of 217,200 acres in 1934 to 1938; percentages 75.3 and 52.4.

Yugoslavia: The colza crop has been seriously affected by the extreme cold of winter and by the unfavourable climatic conditions of the spring. According to private sources of information, the colza crop of this year is considerably inferior to that of last year.

CURRENT INFORMATION ON FODDER CROPS.

Denmark: The condition of the fodder crops is below the average and less good than last year; that of turnip-cabbage is particularly bad.

Greatly reduced yields of hay from temporary meadows are anticipated; pastures have suffered even more from the drought. The condition of fodder crops at the beginning of July compared with that of the corresponding period for last year was as follows: Rotation meadows 69 (64); permanent meadows 76 (77); pasture 58 (78); turnips 92 (99); mangolds 90 (96).

Estonia: The situation of the rotation meadows which have suffered from drought has become worse as compared to that of the preceding month, and expressed according to the system of the Institute is quoted at 68. A production below the average is expected. The late cold has caused damage to the permanent fields and to the pastures.

Finland: During the month of June weather conditions, characterized by drought, were unfavourable to fodder crops, the condition of which at the beginning of July was below the average and quoted at 4.4 according to the system of the country.

Hungary: At the beginning of the month of July, mangolds were growing very well and their weeding was being effected. Millet, buckwheat and Indian millet are well-grown and the condition of the crop is satisfactory. The first cutting of clover has already been carried out and, here and there the second cutting has been begun.

The hay yield is good or average only in some parts, while it is bad both quantitatively and qualitatively in the greater number of regions. The yield of the first cutting of alfalfa is however good or average in quantity, the quality being in general poor. The second cutting of this crop is still being carried out and the yields are on the whole good. Among other fodder crops, the mixture of oats and vetches gives an average yield; maize for green fodder, moha, sainfoin and vetches are developing well.

At the beginning of July, the cutting of permanent meadows was finished almost everywhere. The yields are very variable. The weather has been unfavourable to hay-making. The production of hay is good to average as regards quantity, but only average to bad as regards quality. The second crop is growing vigorously.

The growth of pastures is good on the whole.

Lithuania: Lack of rains have retarded the growth of forages. Hay-making had begun at the middle of June in very good conditions.

Norway: In the south and south-east, mangolds are irregular and they have urgent need of rain. Aphids have caused serious damage and in the south-west and the centre re-sowing has had to be resorted to.

Rotation meadows have developed late and the production of the second crop will be poor owing to drought.

Permanent meadows in the mountainous regions have given good yields up till now, but they are beginning to suffer from drought. The other meadows have already suffered considerably in the southern regions, where, in some localities, they have only given two-thirds or even only half of their usual yields.

In the central regions the production seems to be average.

Romania: Condition of all fodder crops was average at the beginning of June. A first estimate of the area sown this year to clover and alfalfa (including Bessarabia and North Bucovina) shows the following figures: Clover: 404,000 acres as against 494,000 in 1939 and an average of 442,000 acres for the period 1934-1938 (81.7 per cent.; 91.5 per cent.); corresponding figures for alfalfa are: 202,000 acres as against 385,000 and 338,000 acres (52.4 per cent.; 59.8 per cent.).

The crop cut from natural meadows is abundant but the quality of the hay leaves much to be desired due to the rainy weather which prevailed during haymaking.

Switzerland: The favourable weather during the first ten days of June has allowed of the garnering of a fodder crop of excellent quality in vast regions. During the second fortnight of the month, the weather was mainly damp and warm, which was extremely favourable to the growth of grass. The conditions of the permanent and rotation meadows is good and a satisfactory second crop yield may be counted on. Pastures also appear to be in good condition. The condition of permanent meadow crops, according to the system of the country, was quoted on July 1 at 76, against 74 on June 1, 1940 and 87 on July 1, 1939; for rotation meadows (clover, alfalfa, etc.) the quotations are respectively as follows: 76, 74 and 88. The quotations for pastures are 78, 76 and 73.

U. R. S. S.: The hay crop in the southern and central part of the Union, where the mowing has already been effected or is on the point of being effected, is considered good. At the end of June climatic conditions have been favourable to hay-making which however, in some regions, was being done rather slowly. The crop has been particularly good in Kasakstan where nearly a quarter of the surfaces of natural meadows are located.

CURRENT INFORMATION ON SERICULTURE.

Italy: At the end of June the silkworm breeding season in Italy could be considered as concluded. The collecting of the cocoons is being effected regularly. According to the first estimate, the production of spring cocons is considered to be about 74 million lb against 63 millions in 1939.

The quantity of eggs incubated in spring 1940 has been 504,800 ounces against 491,000 ounces in 1939. Average yields are very high and near to the maximums of the last twenty years.

TRADE

| COUNTRIES | MAY | | | | TEN MONTHS (August 1-May 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|-----------------|--------|------------------|-------|------------------------------|------------|------------------|---------|----------------------------------|--------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Wheat. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (*) 15,173 | (*) 10,331 | (*) 0 | (*) 0 | 16,316 | 0 |
| Romania | 1,209 | 2,064 | 0 | 0 | 17,747 | 21,581 | 0 | 0 | 27,571 | 0 |
| Yugoslavia | 218 | 73 | 0 | 0 | 5,116 | 3,166 | 0 | 0 | 3,233 | 0 |
| United States | 136 | 6,403 | 531 | 601 | 11,630 | 41,860 | 5,395 | 4,921 | 46,004 | 6,134 |
| Argentina | 10,600 | 10,181 | — | — | 86,744 | 49,445 | — | — | 70,352 | — |
| Iraq | 50 | 39 | 0 | 0 | 1,076 | 584 | 0 | 0 | 621 | 0 |
| Iran | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 0 | (*) 0 | 0 | 0 |
| Turkey | 732 | 11 | — | — | 1,051 | 1,079 | — | — | 1,098 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 1,017 | 1,217 | 0 | 0 | 5,592 | 5,653 | 0 | 7,740 |
| China | 55 | 73 | 138 | 1,512 | 232 | 380 | 2,475 | 5,740 | 511 | 9,597 |
| Taiwan | — | — | — | — | — | — | (*) 3 | (*) 0 | — | 14 |
| Wheat Flour. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (*) 1,241 | (*) 497 | (*) 0 | (*) 0 | 1,027 | 0 |
| Romania | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 |
| Yugoslavia | 43 | 3 | 0 | 0 | 202 | 31 | 0 | 0 | 32 | 0 |
| United States | 839 | 1,592 | 12 | 20 | 10,502 | 11,013 | 107 | 126 | 14,059 | 159 |
| Argentina | 104 | 203 | — | — | 1,732 | 1,715 | — | — | 2,049 | — |
| Iraq | 13 | 14 | 0 | 0 | 142 | 130 | 0 | 0 | 153 | 0 |
| Iran | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 0 | (*) 0 | 0 | 0 |
| Turkey | 0 | 8 | — | — | 1 | 69 | — | — | 75 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 4 | 6 | 0 | 0 | 33 | 37 | 0 | 43 |
| China | 17 | 250 | 878 | 1,407 | 763 | 817 | 4,876 | 5,686 | 1,176 | 7,108 |
| Taiwan | ... | ... | ... | ... | (*) 18 | (*) 6 | (*) 0 | (*) 0 | 8 | 0 |
| Total Wheat and Flour †: — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | NET EXPORTS (*) | | NET IMPORTS (**) | | NET EXPORTS (*) | | NET IMPORTS (**) | | N. EX. (*) | N. IMP. (**) |
| Greece | — | — | 1,023 | 1,224 | — | — | 5,636 | 5,702 | — | 7,797 |
| Hungary | ... | ... | ... | ... | (*) 16,827 | (*) 10,993 | — | — | 17,685 | — |
| Romania | 1,209 | 2,064 | — | — | 17,748 | 21,584 | — | — | 27,574 | — |
| Yugoslavia | 276 | 77 | — | — | 5,384 | 3,209 | — | — | 3,276 | — |
| United States | 708 | 7,898 | — | — | 20,094 | 51,454 | — | — | 58,402 | — |
| Argentina | 10,739 | 10,452 | — | — | 89,052 | 51,731 | — | — | 73,103 | — |
| China | ... | ... | 1,231 | 2,982 | — | — | 7,727 | 11,852 | — | 16,996 |
| Taiwan | ... | ... | ... | ... | (*) 21 | (*) 7 | — | — | — | 3 |
| Iraq | 66 | 58 | — | — | 1,265 | 756 | — | — | 825 | — |
| Iran | — | — | ... | ... | — | — | (*) 0 | (*) 0 | — | 0 |
| Turkey | 732 | 22 | — | — | 1,053 | 1,171 | — | — | 1,198 | — |
| Rye. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| Hungary | ... | ... | ... | ... | (*) 271 | (*) 210 | (*) 0 | (*) 0 | 309 | 0 |
| Romania | 233 | 114 | 0 | 0 | 1,729 | 362 | 0 | 0 | 640 | 0 |
| United States | 63 | 0 | 0 | 0 | 408 | 374 | 0 | 0 | 374 | 0 |
| Argentina | 461 | 285 | — | — | 5,500 | 1,339 | — | — | 2,064 | — |
| Turkey | 55 | 76 | — | — | 195 | 147 | — | — | 177 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(*) Excess of exports over imports. — (**) Excess of imports over exports.

(†) Flour reduced to grain on the basis of the coefficient: 1 cental of flour = 1,333.333 centals of grain.

(‡) Up to April 30. — (2) Up to March 31. — (3) Up to the end of February.

| COUNTRIES | MAY | | | | TEN MONTHS (August 1-May 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|---------|-------|---------|-------|------------------------------|----------------------|----------------------|---------------------|-------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| | | | | | | | | | | |
| Barley. Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (¹) 155 | (¹) 65 | (¹) 0 | (¹) 0 | 107 | 0 |
| Romania | 0 | 424 | 0 | 0 | 2,329 | 3,316 | 0 | 0 | 4,195 | 0 |
| United States | 19 | 292 | 16 | 35 | 1,553 | 4,880 | 173 | 35 | 5,101 | 237 |
| Argentina | 248 | 425 | — | — | 8,647 | 4,057 | — | — | 4,644 | — |
| Iraq | 674 | 568 | 0 | 0 | 3,959 | 3,855 | 0 | 0 | 4,573 | 0 |
| Iran | ... | ... | ... | ... | (¹) 113 | (¹) 54 | (¹) 0 | (¹) 0 | 97 | 0 |
| Turkey | 98 | 130 | — | — | 998 | 2,179 | — | — | 2,740 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 6 | 0 | 0 | 54 | 344 | 0 | 344 |
| Oats. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 0 | (¹) 0 | 0 | 0 |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United States | 3 | 2 | 753 | 95 | 58 | 1,107 | 2,727 | 242 | 1,114 | 427 |
| Argentina | 402 | 351 | — | — | 8,109 | 5,087 | — | — | 5,957 | — |
| Turkey | 0 | 9 | — | — | 6 | 174 | — | — | 231 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 165 | 0 | 0 | 0 |
| Maize. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| SEVEN MONTHS (November 1-May 31) | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (¹) 0 | (¹) 224 | (¹) 72 | (¹) 0 | 1,038 | 0 |
| Romania | 1,841 | 1,839 | 0 | 0 | 8,416 | 9,141 | 0 | 0 | 12,014 | 0 |
| Yugoslavia | 1 | 742 | 0 | 0 | 12 | 1,692 | 0 | 0 | 2,334 | 0 |
| United States | 692 | 658 | 45 | 18 | 12,302 | 14,640 | 205 | 137 | 19,783 | 253 |
| Argentina | 6,332 | 9,621 | — | — | 34,597 | 37,953 | — | — | 74,809 | — |
| China | 0 | 0 | — | — | 0 | 26 | — | — | 26 | — |
| Iraq | 0 | 0 | — | — | 1 | 1 | — | — | 3 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 8 | 187 | 0 | 0 | 313 | 988 | 0 | 1,336 |
| Rice. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| FIVE MONTHS (January 1-May 31) | | | | | | | | | | |
| United States | 289 | 292 | 60 | 88 | 1,444 | 1,514 | 173 | 337 | 3,093 | 711 |
| Taiwan | ... | ... | ... | ... | (¹) 81 | (¹) 89 | (¹) 0 | (¹) 0 | 296 | 0 |
| Iraq | 1 | 0 | 0 | 0 | 2 | 10 | 0 | 0 | 15 | 1 |
| Iran | ... | ... | ... | ... | (¹) 1 | (¹) 0 | (¹) 6 | (¹) 5 | 0 | 18 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 63 | 53 | 0 | 0 | 317 | 293 | 0 | 647 |
| Hungary | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 113 | (¹) 92 | 0 | 584 |
| Yugoslavia | 0 | 0 | 11 | 10 | 0 | 0 | 134 | 180 | 0 | 394 |
| China | 20 | 3 | 915 | 1,749 | 26 | 140 | 6,449 | 4,121 | 156 | 7,060 |

(¹) Up to April 30. — (²) Up to March 31. — (³) Up to the end of February.

| COUNTRIES | MAY | | | | FIVE MONTHS (January 1-May 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|---|---------|--------|---------|--------|--------------------------------|------------------------|----------------------|------------------------|--------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Linseed. — Tousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Argentina | 1,511 | 1,687 | — | — | 12,883 | 14,431 | — | — | 26,082 | — |
| China | 0 | 18 | — | — | 0 | 42 | — | — | 99 | — |
| Iraq | 0 | 0 | — | — | 6 | 10 | — | — | 63 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 1 | 5 | 0 | 0 | 24 | 3 | 0 | 71 |
| Hungary | — | — | — | — | (¹) 0 | (¹) 0 | (¹) 3 | (¹) 32 | 0 | 34 |
| United States | — | — | 803 | 647 | — | — | 4,159 | 5,019 | — | 8,976 |
| Cotton. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| United States | 1,192 | 747 | 71 | 70 | 31,306 | 16,400 | 687 | 611 | 17,562 | 749 |
| Argentina | 45 | 0 | — | — | 409 | 349 | — | — | 555 | — |
| China | 4 | 17 | 464 | 795 | 84 | 1,278 | 4,356 | 2,288 | 1,305 | 3,698 |
| Iraq | 0 | 5 | 0 | 0 | 57 | 51 | 1 | 1 | 53 | 2 |
| Iran | — | — | — | — | (¹) 294 | (¹) 100 | (¹) 0 | (¹) 0 | 223 | 0 |
| Turkey | 25 | 24 | — | — | 118 | 328 | — | — | 385 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 20 | 5 | 0 | 0 | 65 | 37 | 0 | 49 |
| Hungary | — | — | — | — | (¹) 0 | (¹) 0 | (¹) 342 | (¹) 371 | 0 | 629 |
| Yugoslavia | 0 | 0 | 21 | 20 | 0 | 0 | 402 | 438 | 0 | 515 |
| Wool. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Argentina (a) | 13,920 | 25,651 | — | — | 178,405 | 248,958 | — | — | 299,148 | — |
| Argentina (b) | 4,866 | 5,110 | — | — | 59,642 | 43,358 | — | — | 56,745 | — |
| China | 123 | 212 | — | — | 774 | 5,990 | — | — | 6,671 | — |
| Iraq | 2,685 | 840 | 0 | 0 | 13,988 | 13,603 | 37 | 15 | 19,672 | 57 |
| Iran | — | — | — | — | (¹) 8,973 | (¹) 2,498 | (¹) 0 | (¹) 0 | 6,151 | 0 |
| Turkey (a) | 2 | 1,488 | — | — | 5,474 | 14,253 | — | — | 21,272 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 101 | 467 | 681 | 895 | 498 | 1,327 | 3,563 | 5,055 | 2,103 | 7,657 |
| Hungary | — | — | — | — | (¹) 0 | (¹) 289 | (¹) 697 | (¹) 1,607 | 1,027 | 3,208 |
| Romania | — | — | — | — | (¹) 0 | (¹) 18 | (¹) 143 | (¹) 686 | 62 | 840 |
| Yugoslavia | 0 | 0 | 791 | 966 | 0 | 269 | 5,139 | 9,383 | 353 | 11,475 |
| United States | 2 | 51 | 18,466 | 20,543 | 542 | 317 | 259,756 | 166,139 | 417 | 209,676 |
| Butter. — Thousand lb. | | | | | | | | | | |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Hungary | — | — | — | — | (¹) 57 | (¹) 728 | (¹) 0 | (¹) 0 | 3,305 | 0 |
| Romania | — | — | — | — | (¹) 236 | (¹) 143 | (¹) 0 | (¹) 0 | 935 | 0 |
| Argentina | 355 | 459 | — | — | 10,000 | 7,282 | — | — | 19,745 | — |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Greece | — | — | 13 | 115 | — | — | 88 | 487 | — | 1,047 |
| United States | 174 | 152 | 130 | 130 | 1,025 | 769 | 551 | 459 | 2,308 | 1,107 |
| China | — | — | 26 | 57 | — | — | 203 | 276 | — | 593 |
| Iraq | 0 | 0 | 4 | 4 | 0 | 2 | 15 | 20 | 2 | 40 |
| Iran | — | — | — | — | (¹) 2 | (¹) 2 | (¹) 40 | (¹) 84 | 4 | 185 |

(a) Unwashed wool. — (b) Washed wool.

(1) Up to April 30. — (2) Up to March 31. — (3) Up to the end of February.

| COUNTRIES | MAY | | | | FIVE MONTHS (January 1-May 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|--|---------|--------|---------|---------|--------------------------------|----------------------------|-------------------------|-------------------------|--------------------------------------|-----------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Cheese. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | 701 | 434 | — | — | (¹) 7 | (²) 13 | (³) 2 | (⁴) 0 | 741 | 2 |
| Argentina | — | — | — | — | 2,167 | 1,931 | — | — | 5,474 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 53 | 2 | 346 | 256 | 340 | 26 | 1,014 | 1,801 | 95 | 2,202 |
| United States | 165 | 130 | 4,072 | 4,354 | 778 | 600 | 17,619 | 21,502 | 1,479 | 59,075 |
| Iraq | 0 | 7 | 2 | 2 | 0 | 15 | 20 | 37 | 15 | 60 |
| Iran | — | — | — | — | (¹) 0 | (²) 0 | (³) 4 | (⁴) 0 | 0 | 7 |
| Cacao. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Dominican Republic | — | — | — | — | (¹) 20,893 | (²) 33,497 | — | — | 63,690 | — |
| Ecuador | — | — | — | — | (¹) 8,953 | (²) 12,712 | — | — | 36,174 | — |
| São Thomé and Príncipe Islands | — | — | — | — | (¹) 15,327 | (²) 14,864 | — | — | 23,202 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 150 | 406 | 2 | 0 | 1,127 | 2,888 | 0 | 4,101 |
| Hungary | — | — | — | — | — | — | (¹) 1,303 | (²) 5,342 | — | 13,045 |
| United States | — | — | 45,067 | 64,710 | — | — | 388,310 | 433,243 | — | 583,184 |
| Iran | — | — | — | — | — | — | (¹) 42 | (²) 82 | — | 128 |
| Tea. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| China | 7,333 | 3,153 | 3,400 | 1,329 | 79,625 | 81,494 | 17,562 | 5,470 | 83,388 | 7,015 |
| Taiwan | — | — | — | — | (¹) 13,671 | (²) 18,874 | (³) 0 | (⁴) 0 | 20,435 | 0 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 7 | 22 | — | — | 223 | 379 | — | 414 |
| Hungary | — | — | — | — | — | — | (¹) 185 | (²) 443 | — | 677 |
| United States | — | — | 4,921 | 6,581 | — | — | 93,564 | 82,876 | — | 89,601 |
| Iraq | 0 | 0 | 721 | 734 | 7 | 71 | 6,266 | 6,729 | 71 | 7,300 |
| Iran | — | — | — | — | (¹) 0 | (²) 0 | (³) 13,466 | (⁴) 13,373 | — | 17,785 |
| Turkey | — | — | 306 | 185 | — | — | 2,103 | 1,986 | — | 2,174 |
| Coffee. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Costa Rica | — | — | — | — | (¹) 36,707 | (²) 40,726 | — | — | 45,429 | — |
| Guatemala | 11,248 | 9,561 | — | — | 85,661 | 89,477 | — | — | 95,330 | — |
| Brazil | — | — | — | — | (¹) 1,732,683 | (²) 1,751,748 | — | — | 2,155,720 | — |
| Colombia | 40,210 | 52,455 | — | — | 438,102 | 486,348 | — | — | 537,290 | — |
| Venezuela | — | — | — | — | (¹) 37,761 | (²) 57,534 | — | — | 69,781 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 1,550 | 1,027 | — | — | 10,708 | 11,671 | — | 13,018 |
| Hungary | — | — | — | — | — | — | (¹) 2,238 | (²) 3,073 | — | 5,390 |
| Yugoslavia | — | — | 1,124 | 1,195 | — | — | 13,949 | 14,581 | — | 15,829 |
| United States | 928 | 1,457 | 176,806 | 156,732 | 11,349 | 9,586 | 1,881,819 | 1,793,345 | 10,598 | 1,965,955 |
| Iraq | 0 | 0 | 205 | 357 | 0 | 0 | 2,562 | 2,235 | 0 | 2,588 |
| Iran | — | — | — | — | (¹) 0 | (²) 0 | (³) 344 | (⁴) 776 | 0 | 802 |
| Turkey | — | — | 295 | 906 | — | — | 12,245 | 10,955 | — | 12,260 |

(¹) Up to April 30. — (²) Up to March 31. — (³) Up to the end of February.

STOCKS**Stocks of cereals in farmers' hands in the United States.**

| PRODUCTS | Percentage of total production | | | | | Stocks in 1,000 centals | | | | |
|---------------------|--------------------------------|------------|-----------|-----------|-----------|-------------------------|------------|-----------|-----------|-----------|
| | July 1940 | April 1940 | July 1939 | July 1938 | July 1937 | July 1940 | April 1940 | July 1939 | July 1938 | July 1937 |
| Wheat | 11.3 | 20.9 | 9.7 | 6.8 | 3.5 | 51,313 | 94,490 | 54,223 | 35,468 | 13,111 |
| Oats | 15.3 | 36.9 | 17.6 | 16.9 | 11.2 | 45,997 | 110,771 | 60,068 | 62,741 | 28,210 |
| Maize (1) | 36.5 | 54.5 | 33.2 | 27.4 | 12.4 | 482,985 | 719,883 | 475,868 | 360,036 | 86,864 |

(1) Data based on maize for grain.

Commercial cereals in store in Canada and the United States.

| PRODUCTS AND LOCATION | Friday or Saturday nearest 1st of month (1) | | | | |
|---|---|-----------|----------|-----------|-----------|
| | July 1940 | June 1940 | May 1940 | July 1939 | July 1938 |
| thousand centals | | | | | |
| WHEAT: | | | | | |
| Canadian in Canada | ... | ... | 170,590 | 58,874 | 15,026 |
| U.S. in Canada | ... | ... | 420 | 347 | 414 |
| U.S. in the United States | 52,395 | 58,602 | 63,357 | 48,800 | 17,000 |
| Canadian in the United States | 13,064 | 12,296 | 10,321 | 2,804 | 469 |
| TOTAL | ... | ... | 244,688 | 110,825 | 32,909 |
| RYE: | | | | | |
| Canadian in Canada | ... | ... | 1,776 | 1,413 | 569 |
| U.S. in Canada | ... | ... | 13 | 13 | 65 |
| U.S. in the United States | 5,323 | 5,551 | 5,627 | 4,135 | 560 |
| Canadian in the United States | 1,562 | 1,527 | 701 | 116 | 11 |
| TOTAL | ... | ... | 8,117 | 5,677 | 1,205 |
| BARLEY: | | | | | |
| Canadian in Canada | ... | ... | 3,983 | 3,036 | 2,358 |
| U.S. in Canada | ... | ... | 0 | 5 | 59 |
| U.S. in the United States | 3,339 | 4,228 | 5,200 | 2,981 | 2,770 |
| Canadian in the United States | 587 | 666 | 587 | 29 | 0 |
| TOTAL | ... | ... | 9,770 | 6,051 | 5,187 |
| OATS: | | | | | |
| Canadian in Canada | ... | ... | 3,742 | 3,007 | 1,224 |
| U.S. in Canada | ... | ... | 21 | 60 | 240 |
| U.S. in the United States | 1,002 | 1,478 | 1,985 | 1,822 | 2,184 |
| Canadian in the United States | 83 | 142 | 62 | 32 | 0 |
| TOTAL | ... | ... | 5,810 | 4,921 | 3,648 |
| MAIZE: | | | | | |
| U.S. in Canada | ... | ... | 802 | 1,963 | 4,233 |
| Argentina in Canada | ... | ... | 0 | 12 | 77 |
| South African in Canada | ... | ... | 447 | 191 | 250 |
| Australian in Canada | ... | ... | 0 | 29 | 0 |
| U.S. in the United States | 14,235 | 13,449 | 19,120 | 17,293 | 13,257 |
| TOTAL | ... | ... | 20,369 | 19,488 | 17,817 |

(1) Friday for Canada, Saturday for the United States.

Cotton stocks on hand in the United States.

| LOCATION | Last day of month | | | | |
|---|-------------------|----------|------------|-----------|-----------|
| | June 1940 | May 1940 | April 1940 | June 1939 | June 1938 |
| | thousand centals | | | | |
| In consuming establishments | 5,699 | 6,458 | 7,225 | 5,013 | 7,010 |
| In public storage and at compresses . . . | 47,090 | 49,623 | 52,841 | 58,760 | 48,327 |
| TOTAL . . . | 52,789 | 56,081 | 60,076 | 63,773 | 55,337 |

PRICES

Fixed cereal prices in Germany.

An order of the Price Commissioner and of the Ministry of Food Supplies and Agriculture, issued on June 29, 1940, promulgates the dispositions concerning the regulation of growers' prices for home-grown cereals in 1940-41. Except for slight modifications, the division of the country into price regions (*Preisgebiete*), for each cereal, remains the same as that for the 1939-40 season. Basic prices and the monthly increases for every region are the same as last year.

An additional disposition authorizes the Presidents of the provinces of Danzig-West Prussia and Wartheland, East Prussia and Silesia to fixe prices for the territories of the ex-Free State of Danzig and the eastern provinces annexed.

We reproduce below the prices (in RM per 100 kilograms) for the region which includes Berlin.

| PERIODS | WHEAT | | RYE | | FODDER BARLEY | | FODDER OATS | |
|----------------------------|---------|--------------------|---------|---------------------|---------------|---------------------|-------------|--------------------|
| | 1938-39 | 1939-40 1940-41 | 1938-39 | 1939-40 1940-41 | 1938-39 | 1939-40 1940-41 | 1938-39 | 1939-40 1940-41 |
| July, 1st half | — | — | 17.70 | 17.70 ¹⁾ | 16.00 | 16.20 | — | — |
| July, 2d half | 19.40 | 19.40 | 17.70 | 17.70 ¹⁾ | 16.50 | 16.20 | — | — |
| August, 1st half | 19.70 | 19.60 | 17.90 | 17.90 | 16.50 | 16.40 | 16.60 | — |
| August, 2d half | 19.70 | 19.60 | 17.90 | 17.90 | 16.50 | 16.40 ¹⁾ | 17.10 | 16.90 |
| September | 19.90 | 19.80 | 18.10 | 18.10 | 16.70 | 16.60 | 17.20 | 17.00 |
| October | 20.10 | 20.00 | 18.30 | 18.30 | 16.90 | 16.80 | 17.30 | 17.10 |
| November | 20.30 | 20.20 | 18.50 | 18.50 | 17.00 | 17.00 | 17.40 | 17.20 |
| December | 20.50 | 20.40 | 18.70 | 18.70 | 17.20 | 17.20 | 17.50 | 17.30 |
| January | 20.70 | 20.60 | 18.90 | 18.90 | 17.30 | 17.40 | 17.60 | 17.40 |
| February | 20.90 | 20.80 | 19.20 | 19.10 | 17.40 | 17.60 | 17.70 | 17.50 |
| March | 21.10 | 21.00 | 19.40 | 19.30 | 17.40 | 17.70 | 17.80 | 17.60 |
| April | 21.30 | 21.20 | 19.60 | 19.50 | 17.40 | 17.80 | 17.90 | 17.70 |
| May | 21.40 | 21.40 | 19.70 | 19.70 | 17.40 | 17.90 | 18.00 | 17.80 |
| June | 21.40 | 21.60 | 19.70 | 19.90 | 17.40 | 18.00 | 18.10 | 17.90 |
| July, 1st half | 21.40 | 21.80 | — | — | — | — | 18.10 | 17.90 |
| July, 2d half | — | — | — | — | — | — | 18.10 | 17.90 |
| August, 1st half | — | — | — | — | — | — | 18.10 | 17.90 |

(1) As from 1st to 9th, and 10th to 31st respectively.

PRICES BY PRODUCTS

| DESCRIPTION | July | July | June | June | June | AVERAGE | | | | | Commercial Season | | |
|--|--------|--------|--------|--------|--------|---------|-----------|--------|--------|---------|-------------------|---------------|--|
| | 12 | 5 | 28 | 21 | 14 | June | July | July | | | 1938-39 1) | 1937-38 2) | |
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | | | | | |
| | | | | | | | | | | | | | |
| A) — Spot quotations (1) | | | | | | | | | | | | | |
| Wheat | | | | | | | | | | | | | |
| Budapest: Tisza wheat, 78 kg. per hl. (pengö per 100 kg.) | 20.75 | 20.75 | 20.75 | 20.75 | 20.75 | 20.75 | 19.70 3/4 | 20.54 | 20.42 | 21.44 | | | |
| Braila: Home-grown, good qual. (lei p. ql.) | ... | ... | 660 | n. q. | 625 | 617 | 414 1/2 | 440 | 411 | 520 | | | |
| Winnipeg: No. 1 Manitoba (cents p. 60 lb.) | ... | ... | ... | ... | ... | ... | 55 | 97 1/2 | 62 | 131 1/2 | | | |
| Chicago: No. 2 Hard Winter (cents p. 60 lb.) | 76 | 79 1/2 | 79 1/2 | 81 1/2 | 80 1/2 | 81 1/2 | 68 1/2 | 72 1/2 | 70 1/2 | 96 1/2 | | | |
| Minneapolis (cents per 60 lb.): | | | | | | | | | | | | | |
| No. 1 Northern | 75 1/2 | 81 3/4 | 74 1/2 | 78 3/4 | 80 | 78 3/4 | 73 3/4 | 82 1/2 | 74 1/2 | 104 3/4 | | | |
| No. 2 Amber Durum | 68 | 72 | 63 1/2 | 66 1/2 | 68 | 66 1/2 | 69 3/4 | 73 3/4 | 68 1/2 | 93 1/2 | | | |
| New York: No. 2 Hard Winter (f.o.b. cents per 60 lb.) | 92 1/2 | 97 3/4 | 96 1/2 | 98 1/2 | 99 1/2 | 98 1/2 | 87 3/4 | 90 1/2 | 84 1/2 | 112 1/2 | | | |
| Buenos Aires (a): No. 2 Hard, 80 kg. per hl. (paper pesos per 100 kg.) | ... | ... | ... | ... | ... | ... | 7.00 | 8.80 | 6.89 | 12.20 | | | |
| Rye. | | | | | | | | | | | | | |
| Budapest: Pest rye (pengö p. 100 kg.) | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 | 13.36 | 16.08 | 14.34 | 18.57 | | | |
| Winnipeg: No. 2 rye (cents p. 56 lb.) | ... | ... | ... | ... | ... | ... | 37 1/2 | 48 1/2 | 40 1/2 | 72 1/2 | | | |
| Minneapolis: No. 2 rye (cents p. 56 lb.) | 44 1/2 | 44 1/2 | 40 | 43 1/2 | 43 1/2 | 43 1/2 | 42 1/2 | 48 1/2 | 44 | 67 1/2 | | | |
| Barley. | | | | | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) | ... | ... | 425 | 425 | n. q. | 425 | 307 | 298 | 338 | 365 | | | |
| Winnipeg: No. 4 West. (cents p. 48 lb.) (4) | ... | ... | ... | ... | ... | ... | 30 1/2 | 44 1/2 | 34 1/2 | 56 1/2 | | | |
| Chicago: Feeding (on sample; cents p. 48 lb.) | 39 | 39 | 44 | 44 | 45 | 44 1/2 | 38 1/2 | 43 1/2 | 40 1/2 | 51 1/2 | | | |
| Minneapolis: No. 2 Feeding (cents p. 48 lb.) | 43 1/2 | 43 1/2 | 43 1/2 | 43 1/2 | 43 1/2 | 43 1/2 | 37 1/2 | 41 1/2 | 40 1/2 | 53 1/2 | | | |
| Oats. | | | | | | | | | | | | | |
| Winnipeg: No. 2 White (cents per 34 lb.) | ... | ... | ... | ... | ... | ... | 26 1/2 | 41 1/2 | 29 | 50 1/2 | | | |
| Chicago: No. 2 White (cents per 32 lb.) | 34 | 35 1/2 | 35 1/2 | 36 | 35 1/2 | 35 1/2 | 30 1/2 | 27 1/2 | 30 1/2 | 32 1/2 | | | |
| Buenos Aires (a): No. 2 White, 40 kg. per hl. (paper pesos p. 100 kg.) | ... | ... | ... | ... | ... | ... | 4.12 | 6.02 | 4.81 | 6.32 | | | |
| Milano (b) (lire per 100 kg.): | | | | | | | | | | | | | |
| Home-grown | 162.50 | 162.50 | 162.50 | 162.50 | 162.50 | 162.50 | 102.50 | 91.00 | 98.00 | 100.05 | | | |
| Foreign | n. q. | n. q. | n. q. | n. q. | n. q. | n. q. | 102.50 | 92.50 | 95.90 | 97.15 | | | |
| Maize. | | | | | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) | ... | ... | 515 | 515 | 515 | 516 | 396 | 340 | 365 | 362 | | | |
| Chicago: No. 3 Yellow (cents p. 56 lb.) | 64 1/2 | 64 1/2 | 64 | 64 1/2 | 65 | 64 1/2 | 44 1/2 | 58 1/2 | 53 1/2 | 51 1/2 | | | |
| Buenos Aires (a): Yellow Plata (paper pesos per 100 kg.) | ... | ... | ... | ... | ... | ... | 5.87 | 7.70 | 6.11 | 6.89 | | | |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal.
— (a) Thursday prices. — (b) Saturday prices.

(1) In relation to Government price fixing, numerous series are omitted from this table; notes concerning them have been given in various issues of the Crop Report: United Kingdom: Nov. 1939, p. 1060; Italy: Dec. 1939, p. 1163; Germany: Feb. 1940, p. 142; — (2) August-July. — (3) May-April. — (4) As from Sept. 22, 1939: No. 2 Feeding barley. — (5) New crop. — (6) Prices in Constantza.

| DESCRIPTION | July | July | June | June | June | AVERAGE | | | | | Commercial Season | |
|--|----------|----------|----------|----------|----------|----------|---------|---------|----------|----------|-------------------|---------------|
| | 12 | 5 | 28 | 21 | 14 | July | July | July | | | | |
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | 1939 | 1938 | | |
| Linseed. | | | | | | | | | | | | |
| Buenos Aires (a): Current quality, 4 % impurities (paper pesos p. 100 kg.). | ... | ... | ... | ... | ... | ... | 14.49 | 14.34 | 15.12 | 14.31 | | |
| London (c.i.f., shipping current or fol- lowing month; £ per long ton): | | | | | | | | | | | | |
| La Plata | 15-0-0 | 15-0-0 | 15-0-0 | 15-0-0 | 15-0-0 | 15-0-0 | 11-6-3 | 11-14-0 | *12-2-3 | 11-10-11 | | |
| Bombay | 17-7-6 | 17-7-6 | 17-7-6 | 17-7-6 | 17-13-6 | 17-15-6 | 12-14-4 | 13-0-3 | *14-10-3 | 13-3-9 | | |
| Minneapolis: No. 1 Northern (cta. p. 56 lb.). | 162 1/2 | 168 | 160 | 169 | 173 | 171 1/2 | 179 1/2 | 159 | 180 | 190 | | |
| Cotton. | | | | | | | | | | | 1938-39 1) | 1937-38 1) |
| New Orleans: Middling (cents p. lb.). | n. 10.50 | n. 10.55 | n. 10.60 | n. 10.74 | ... | n. 10.54 | n. 9.37 | 8.94 | 8.75 | 8.87 | | |
| New York: Middling (cents per lb.). | n. 10.50 | n. 10.46 | n. 10.85 | n. 10.93 | n. 10.01 | n. 10.54 | n. 9.75 | 8.87 | 9.00 | 8.75 | | |
| Liverpool (perce per lb.): | | | | | | | | | | | | |
| Middling, super good | ... | ... | ... | ... | ... | ... | n. 6.14 | 5.76 | 5.88 | 5.79 | | |
| Middling | 7.95 | 7.82 | 7.60 | 7.82 | 7.25 | ... | 5.44 | 5.01 | 5.17 | 4.97 | | |
| São Paulo, g.f. | ... | ... | ... | ... | ... | ... | 5.25 | 5.11 | 5.14 | 5.16 | | |
| Broach, good staple, f.g. (*) | n. 6.26 | n. 6.13 | n. 6.05 | n. 6.43 | n. 6.18 | ... | 4.01 | n. 3.92 | n. 3.92 | 4.04 | | |
| C.P. Oomra, good staple, superfine (*) | 6.17 | 6.04 | 5.96 | 6.19 | 6.04 | ... | 4.25 | 4.14 | 4.11 | 4.29 | | |
| Giza 7, f.g.f. | 11.28 | 11.25 | 11.44 | 11.51 | 10.12 | ... | 6.51 | 7.40 | 7.22 | 7.42 | | |
| Upper Egyptian, f.g.f. | 11.80 | 11.68 | 11.60 | 11.70 | 10.13 | ... | 5.86 | 6.09 | 6.00 | 6.31 | | |

B) — Quotations for future delivery

| Wheat. | | MONTHS | | | | | | | | | | |
|--|--------|-----------|--------|-----------|----------|----------|------------|----------|---------|---------|--|-------|
| | | July 1937 | | July 1936 | | | | | | | | |
| Winnipeg (cents p. 60 lb.): | | | | | | | | | | | | |
| delivery July | 71 3/4 | 71 3/4 | 71 3/4 | 71 3/4 | 72 1/4 | 72 1/2 | 53 1/2 (*) | 101 1/2 | 145 3/4 | 94 1/2 | | |
| » October | 73 1/4 | 73 1/4 | 73 1/4 | 73 3/4 | 75 | 75 | 54 1/2 (*) | 78 3/4 | 137 1/2 | 94 | | |
| » December | 74 1/4 | 74 1/4 | 74 1/4 | 75 | 76 3/4 | 75 3/4 | 56 (*) | 77 | 134 1/4 | 93 1/2 | | |
| Chicago (cents p. 60 lb.): | | | | | | | | | | | | |
| delivery July | 72 3/4 | 77 3/4 | 76 1/4 | 78 1/4 | 79 1/4 | 78 3/4 * | 65 1/2 | 71 1/4 | 122 3/4 | 104 1/4 | | |
| » September | 73 3/4 | 77 1/4 | 76 1/4 | 78 1/4 | 80 1/4 | 79 1/4 | 66 | 71 1/4 | 123 3/4 | 106 | | |
| » December | 75 | 78 3/4 | 77 3/4 | 79 | 81 | 80 1/4 | 67 1/2 | 73 3/4 | 125 1/4 | 107 | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | | | |
| delivery June | — | — | — | 8.45 | 8.45 | 8.51 | — | — | — | — | | |
| » July | — | 9.06 | 9.21 | 8.63 | 8.55 | 8.79 | 7.00 | 8.91 | — | — | | 10.96 |
| » August | 9.21 | 9.26 | 9.38 | 8.83 | 8.65 | 8.94 | 7.00 | 8.68 * | 14.03 | 10.96 | | |
| » September | 9.35 | 9.45 | 9.58 | — | — | — | 7.00 | 8.77 * | 13.75 | 11.00 | | |
| » October | 9.50 | — | — | — | — | — | 7.00 | 8.44 * | 13.56 | — | | |
| Rye. | | | | | | | | | | | | |
| Winnipeg (cents p. 56 lb.): | | | | | | | | | | | | |
| delivery July | 45 | 45 1/2 | 40 1/2 | 44 1/2 | 46 1/2 | 45 1/2 | 37 1/2 | 48 1/2 | 149 1/2 | 58 1/2 | | |
| » October | 45 1/2 | 48 1/2 | 39 1/2 | 43 1/2 | 45 1/2 | 43 1/2 | 38 1/2 | 49 1/2 | 98 | 59 1/2 | | |
| » December | 43 1/4 | 44 1/4 | 40 1/4 | 43 1/4 | 45 1/4 * | 43 1/4 | 39 1/4 | 50 1/4 | 95 1/4 | 59 1/4 | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | | | | |
| delivery July | 43 1/2 | 42 1/2 | 39 1/2 | 41 1/2 | 43 1/2 | 42 1/2 | 41 | 52 1/2 * | 91 1/2 | 72 1/2 | | |
| » September | 44 1/2 | 43 1/2 | 41 1/2 | 43 1/2 | 45 | 44 1/2 | 42 1/2 | 54 1/2 | 100 1/2 | 73 1/2 | | |
| » December | 47 | 46 1/2 | 43 1/2 | 45 1/2 | 47 1/2 | 46 1/2 | 44 1/2 | 52 | 88 1/2 | 74 | | |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal. — (*) Thursday prices.

(*) August-July. — (†) As from March 15, 1939: "fair staple". — (‡) June 7: 15-0-0. — (§) June 7: 18-13-6. — (¶) Quotations of July 15.

| DESCRIPTION | July | July | June | June | June | AVERAGE | | | | |
|--|------------|-----------|------------|------------|------------|--------------|--------------|--------------|--------------|--------------|
| | 12 1940 | 5 1940 | 28 1940 | 21 1940 | 14 1940 | June 1940 | July 1939 | July 1938 | July 1937 | July 1936 |
| Barley. | | | | | | | | | | |
| Winnipeg (cents p. 48 lb.): | | | | | | | | | | |
| delivery July | 34 | 35 | 32 1/4 | 33 3/8 | 35 3/8 | 34 7/8 | 34 3/8 | 47 7/8 | 71 3/8 | 51 1/8 |
| " October | 35 1/8 | 36 1/8 | 33 1/2 | 34 1/4 | 36 | 35 1/2 | 34 | 46 3/4 | 66 3/8 | 49 1/2 |
| " December | 35 1/8 | 36 1/8 | 34 1/8 | 34 3/4 | 36 1/4 * | 35 1/8 | 34 1/4 | 45 1/8 | 65 1/8 | 49 1/8 |
| Minneapolis (cents p. 48 lb.): | | | | | | | | | | |
| delivery July | n. q. | n. q. | n. q. | 34 | 35 | 35 1/4 | 31 3/8 | 40 3/4 | 62 1/4 | 57 |
| " September | n. q. | n. q. | n. q. | 35 | 35 1/8 | 35 1/8 | 30 5/8 | 39 5/8 | 56 1/2 | 59 1/8 |
| Oats. | | | | | | | | | | |
| Winnipeg (cents p. 34 lb.): | | | | | | | | | | |
| delivery July | 32 3/4 | 31 7/8 | 29 1/2 | 29 3/8 | 31 1/2 | 30 3/8 | 26 1/4 | 41 | 65 | 41 3/8 |
| " October | 28 1/4 | 29 | 26 1/4 | 27 1/4 | 29 1/2 | 28 1/4 | 26 3/8 | 34 7/8 | 54 1/4 | 40 3/8 |
| " December | 26 1/4 | 27 1/4 | 26 3/8 | 26 1/4 | 28 3/4 | 27 1/4 | 26 | 32 1/4 | 51 1/2 | 38 7/8 |
| Chicago (cents p. 32 lb.): | | | | | | | | | | |
| delivery July | 30 1/8 | 31 3/4 | 30 7/8 | 31 1/4 | 32 1/4 | 32 | 28 1/4 | 26 1/2 | 41 3/4 | 36 1/8 |
| " September | 28 1/8 | 29 1/8 | 28 3/8 | 29 3/8 | 30 1/8 | 30 1/8 | 27 1/2 | 25 3/4 | 35 3/4 | 38 1/4 |
| " December | 29 1/8 | 30 | 29 3/8 | 30 1/4 | 31 3/8 | 30 3/8 | 28 3/8 | 27 | 37 1/2 | 39 3/4 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery June | — | — | — | 4.98 | 4.98 * | 4.98 | — | — | — | — |
| " July | — | 5.05 | 5.05 | — | — | — | 4.21 | 6.03 | — | — |
| " August | 5.05 | — | — | — | — | — | 4.07 | 5.97 | — | — |
| Maize. | | | | | | | | | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | | |
| delivery July | 61 1/4 | 61 3/4 | 61 1/4 | 62 1/8 | 61 3/4 | 62 1/4 | 43 1/4 | 57 3/8 | 126 1/4 | 85 3/8 |
| " September | 57 1/4 | 58 7/8 | 59 1/8 | 60 | 60 3/4 | 60 3/4 | 43 1/4 | 59 | 107 1/4 | 86 1/8 |
| " December | 54 1/8 | 55 3/4 | 57 3/8 | 57 3/4 | 57 3/4 | 58 1/4 | 44 7/8 | 57 3/4 | 78 1/8 | 80 1/4 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery June | — | — | — | 4.08 | 4.08 * | 4.09 | — | — | — | — |
| " July | — | 4.37 | 4.25 | 4.23 | 4.20 | 4.24 | 6.13 | 7.73 | — | 5.55 |
| " August | 4.43 | 4.46 | 4.40 | 4.36 | 4.28 | 4.36 | 5.85 | 7.56 * | 6.66 | 5.57 |
| " September | 4.52 | 4.58 | 4.50 | — | — | — | 5.88 | 7.43 * | 6.69 | 5.60 |
| " October | 4.59 | — | — | — | — | — | 5.69 | 7.38 * | 6.71 | — |
| Linseed. | | | | | | | | | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery June | — | — | — | 15.11 | 15.11 * | 15.11 | — | — | — | — |
| " July | — | 15.25 | 15.25 | 15.25 | 15.25 | 15.25 | 14.57 | 14.70 | — | 15.34 |
| " August | 15.45 | 15.45 | 15.45 | 15.45 | 15.45 | 15.45 | 14.30 | 14.59 * | 16.12 | 15.48 |
| " September | 15.45 | 15.45 | 15.45 | — | — | — | 14.36 | 14.57 * | 16.15 | 15.66 |
| " October | 15.45 | — | — | — | — | — | 14.06 | 14.38 * | 16.27 | — |
| Duluth (cents p. 56 lb.): | | | | | | | | | | |
| delivery July | n. q. | n. q. | n. q. | 166 | 171 | 172 1/2 | 155 | 177 1/2 | 204 3/4 | 203 1/4 |
| " September | n. q. | n. q. | n. q. | 168 | 171 | 172 1/2 | 153 | 177 1/2 | 204 1/4 | 204 1/4 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted.

AVERAGE MONTHLY PRICES BY COUNTRIES (1)

| Groups | Description | AVERAGE | | | | | | Agricultural year (1) | |
|--|--|-----------|------------|----------|---------------|----------------|----------------|-----------------------|----------|
| | | June | May | April | Jan- March | April- June | April- June | 1938-39 | 1937-38 |
| | | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | | |
| GERMANY (Prices in Reichsmarks per quintal) | | | | | | | | | |
| A I | †Wheat (Berlin) | 21.60 | 21.40 | 21.20 | 20.80 | 21.37 | 20.70 | 20.56 | 20.52 |
| | †Rye (Berlin) | 19.90 | 19.70 | 19.50 | 19.10 | 19.67 | 18.67 | 18.81 | 18.69 |
| | †Barley, feeding (Berlin) | 18.00 | 17.90 | 17.80 | 17.57 | 17.40 | 17.07 | 17.08 | 16.99 |
| | †Oats (Berlin) | 17.90 | 17.80 | 17.70 | 17.50 | 18.00 | 17.27 | 17.51 | 16.87 |
| | †Potatoes, red (Berlin) | 6.45 | 5.40 | 5.20 | 4.93 | 5.40 | 5.35 | 5.02 | 4.91 |
| | †Hops (Nürnberg) | 454.00 | 460.00 | 460.00 | 462.00 | 570.00 | 419.35 | 493.45 | 437.33 |
| A II | †Oxen, live weight (Berlin) | 87.00 | 87.00 | 85.20 | 85.73 | 86.33 | 83.33 | 86.35 | 84.15 |
| | †Calves, live weight (Berlin) | 95.40 | 95.40 | 95.40 | 95.40 | 95.40 | 94.33 | 95.40 | 93.98 |
| | †Pigs, 220-265 lb., live weight (Berlin) | 105.00 | 104.20 | 104.00 | 104.00 | 100.40 | 100.40 | 101.67 | 101.88 |
| | †Milk, fresh (Berlin) per hectolitre | 19.01 | 19.06 | 19.06 | 17.56 | 16.62 | 15.60 | 16.11 | 15.35 |
| | †Butter, National Mark | 303.00 | 303.00 | 303.00 | 283.00 | 274.00 | 260.00 | 257.68 | 260.00 |
| | †Creamery butter | 299.00 | 299.00 | 299.00 | 268.53 | 260.00 | 246.00 | 271.69 | 246.00 |
| | †Cheese, Emmenthal type (Kempten) | 186.75 | 186.75 | 186.75 | 170.79 | 160.00 | 160.00 | 160.00 | 160.00 |
| | †Soft cheese, 20 % butterfat (Kempten) | 65.25 | 65.25 | 65.25 | 60.19 | 58.00 | 58.00 | 58.00 | 58.00 |
| | †Eggs, aver. size, marked "G.I.B." (Berlin) per 100 | 10.50 | 10.50 | 10.50 | 11.03 | 8.94 | 10.25 | 10.35 | 10.08 |
| B I | †Basic slag, 16 % (Aachen) (1) | 0.192 | 0.192 | 0.192 | 0.193 | 0.209 | 0.206 | 0.214 | 0.212 |
| | †Superphosphate of lime, 18 % (2-4) | 0.208 | 0.314 | 0.314 | 0.312 | 0.309 | 0.309 | 0.309 | 0.309 |
| | †Potash salts, 40 % (5) | 4.69 | 4.96 | 5.24 | 5.24 | 4.89 | 4.89 | 5.05 | 5.05 |
| | †Sulphate of ammonia, 21 % (6-8) | 0.410 | 0.480 | 0.480 | 0.477 | 0.480 | 0.480 | 0.457 | 0.457 |
| B II | †Wheat-bran (Hamburg) | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 |
| | †Linseed cake (Hamburg) | n. q. | n. q. | n. q. | 16.25 | 16.25 | 16.30 | 16.25 | 16.25 |
| | †Coconut cake (Hamburg) | n. q. | n. q. | n. q. | 14.65 | 14.65 | 14.70 | 14.65 | 14.65 |
| | †Groundnut cake (Hamburg) | n. q. | n. q. | n. q. | 15.75 | 15.75 | 15.80 | 15.75 | 15.75 |
| | †Crushed soya extraction residue (Hamburg) | n. q. | n. q. | n. q. | 15.45 | 15.45 | 15.50 | 15.45 | 15.45 |
| BELGIUM (Prices in Belgian francs per quintal) | | | | | | | | | |
| A I | Wheat (Antwerpen) | (8)159.00 | ... | 158.00 | 152.45 | 129.70 | 146.25 | 123.80 | 136.55 |
| | Rye (Antwerpen) | (8)136.00 | ... | n.141.00 | *133.55 | n. q. | 122.75 | n. q. | 126.00 |
| | Barley (Antwerpen) | (8)174.00 | ... | n.170.00 | *171.95 | n. q. | 123.50 | n. q. | 126.10 |
| | Oats (Antwerpen) | (8)136.00 | ... | n.128.00 | 121.50 | 87.15 | 116.35 | 90.60 | 119.65 |
| | †Potatoes (Leuven) | ... | (10)55.00 | 50.00 | 45.40 | 37.70 | 59.60 | 35.15 | 45.30 |
| | †Flax, fibre (Gent) | ... | ... | 3,313.00 | 3,279.15 | 1,691.65 | 1,662.00 | 1,702.15 | 1,702.00 |
| A II | †Oxen, live weight (Curegem-Anderlecht) | ... | ... | 598.00 | 538.35 | 522.00 | 507.65 | 510.00 | 523.10 |
| | †Calves, live weight (Curegem-Anderlecht) | ... | ... | 919.00 | 771.65 | 783.00 | 759.35 | 825.00 | 803.00 |
| | †Pigs, live weight (Curegem-Anderlecht) | ... | ... | 740.00 | 609.65 | 664.00 | 734.65 | 801.00 | 677.00 |
| | †Butter (Antwerpen) | ... | ... | 2,349.00 | 2,443.00 | 1,912.35 | 2,097.65 | 2,272.00 | 2,354.00 |
| | †Eggs (Antwerpen) per 100 | ... | ... | 49.25 | 65.90 | 44.80 | 46.50 | 57.85 | 57.40 |
| B I | †Basic slag, 15-20 % (Charleroi) (1) | ... | n. 1.20 | 1.20 | 1.30 | 1.90 | 1.65 | * 1.95 | 1.52 |
| | †Superphosphate of lime, 14 % (producer's store) (2) | ... | n. 3.40 | 3.40 | 3.35 | 2.50 | 2.50 | 2.50 | 2.41 |
| | †Sylvinit-Kainite, minimum 14 % | ... | n. 29.25 | 29.25 | 29.25 | 28.40 | 29.50 | 28.65 | 29.00 |
| | †Nitrate of soda, 15 1/2 % (3) | n.116.25 | n.116.25 | 116.25 | (10)111.60 | 114.90 | 115.25 | 110.90 | 113.75 |
| | †Sulphate of ammonia, 20 % (4) | n.106.00 | n.106.00 | 106.00 | (11)95.45 | 94.65 | 100.00 | 95.65 | 98.50 |
| B II | †Maize, Plata (Antwerpen) | (8)140.00 | (11)136.00 | 140.50 | 134.75 | 80.60 | 108.70 | 85.70 | 103.55 |
| | †Linseed cake imported | ... | *150.00 | 154.00 | 164.00 | 109.65 | 118.75 | 114.60 | 117.85 |
| | †Coconut cake imported | ... | *156.00 | 157.00 | 144.65 | 96.85 | 111.85 | 100.35 | 116.25 |
| | †Groundnut cake imported | ... | *160.00 | 162.50 | 158.65 | 97.85 | 106.00 | 102.20 | *111.00 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = quoted. — n. = nominal.

† Indicates that the series is published in the *International Yearbook of Agricultural Statistics*.

(1) Prices of plant (A I) and animal (A II) products sold by the farmer, also of fertilizer (B I) and concentrated feeding stuffs (B II) bought by the farmer. In cases where the market is not indicated, the price is the average for the whole country. — (2) July to June. — (3) Price per kg of active fertilizer contained in 100 kg of commercial fertilizer. — (4) Free at buyer's station. — (5) Prior 1940: in sacs; subsequently: in bulk. — (6) March: 450.00. — (7) March: 85.00. — (8) March: 18.00; February: 16.05; January: 16.84. — (9) Quotation of June 19. — (10) Quotation of May 3.

| GROUPS | DESCRIPTION | AVERAGE | | | | | | Agricultural year | |
|--------|-------------|---------|------|-------|------------|------------|------------|-------------------|---------|
| | | June | May | April | Jan.-March | April-June | April-June | 1938-39 | 1937-38 |
| | | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | | |

DENMARK (Prices in Danish crowns per quintal)

| | | | | | | | | | |
|------|---|----------------------|----------------------|--------|--------|--------|--------------------|--------|--------|
| A I | Wheat (Köbenhavn) | 18.80 ^(*) | 18.70 ^(*) | 18.60 | 19.15 | 14.59 | 16.93 [*] | 14.34 | 18.06 |
| | Barley (Köbenhavn) | 17.80 ^(*) | 17.70 ^(*) | 17.60 | 17.40 | 11.69 | 15.82 | 12.12 | 17.26 |
| | Oats (Köbenhavn) | 17.80 ^(*) | 17.70 ^(*) | 17.60 | 17.40 | 12.74 | 15.07 | 12.14 | 15.93 |
| A II | †Cows, live weight (Köbenhavn) | 53.50 | 50.90 | 52.75 | 52.85 | 46.78 | 39.67 | 42.63 | 40.36 |
| | †Pork, dead weight | 182.00 | 182.00 | 181.33 | 186.33 | 165.70 | 182.17 | 171.27 | 177.16 |
| | Fresh milk | 16.75 | 16.75 | 16.75 | 16.75 | 14.08 | 14.34 | 14.23 | 13.85 |
| | †Butter (Köbenhavn) | 264.00 | n. 264.00 | 258.00 | 268.20 | 219.48 | 221.97 | 237.95 | 235.55 |
| | Whole milk cheese (Odense) | 155.00 | 155.00 | 160.00 | 169.17 | 133.35 | 140.00 | 137.60 | 133.30 |
| | †Eggs, for export. | 111.50 | 101.75 | 76.50 | 122.50 | 87.37 | 91.47 | 112.26 | 119.37 |
| B I | †Superphosphate, 18 % | n. q. | n. q. | n. q. | n. q. | 6.80 | 6.80 | 6.62 | 6.61 |
| | Potash salts, 40 % | n. q. | n. q. | n. q. | n. q. | 13.95 | 13.95 | 13.49 | 13.49 |
| | †Sulphate of ammonia, 20.8 % | n. q. | n. q. | n. q. | n. q. | 17.10 | 17.10 | 16.57 | 16.50 |
| | †Nitrate of lime, 15 1/4 % | n. q. | n. q. | n. q. | n. q. | 17.05 | 17.05 | 16.52 | 16.45 |
| B II | Rye, imported (Jutland) | 19.18 ^(*) | 19.70 ^(*) | 19.60 | 20.47 | 14.68 | 15.69 | 14.48 | 17.81 |
| | Maize, Plata (Jutland) | 24.50 | 21.25 | 18.67 | 14.75 | 16.80 | 15.35 | 16.13 | 16.13 |
| | Wheat-bran, Danish (Köbenhavn) | n. q. | n. q. | 18.94 | 18.60 | 10.85 | 15.13 | 11.26 | 14.89 |
| | Cottonseed cake (Köbenhavn) | n. q. | n. q. | 26.26 | 25.05 | 14.46 | 15.20 | 14.66 | 16.24 |
| | †Sunflower-seed cake (Köbenhavn) | n. q. | n. q. | 25.20 | 24.85 | 15.27 | 15.81 | 15.70 | 17.01 |
| | Groundnut cake (Köbenhavn) | n. q. | n. q. | 27.00 | 27.01 | 15.42 | 16.49 | 16.04 | 17.26 |
| | Crushed soya extraction residue (Köbenhavn) | n. q. | n. q. | 26.60 | 25.98 | 16.43 | 16.37 | 16.35 | 17.24 |

ITALY (Prices in lire per quintal)

| | | | | | | | | | |
|------|---|----------|----------|----------|----------|----------|----------|----------|----------|
| A I | †Wheat, soft (Milano) | 155.75 | 155.75 | 155.75 | 152.50 | 148.00 | 141.35 | 148.00 | 138.85 |
| | Wheat, hard (Catania) | 164.75 | 164.75 | 164.75 | 161.50 | 157.00 | 150.35 | 157.00 | 148.40 |
| | Oats (Milano) | 162.50 | 162.50 | 151.25 | 147.50 | 99.60 | 100.75 | 97.05 | 101.00 |
| | †Maize (Milano) ⁽¹⁾ | 110.15 | 110.15 | 110.15 | 109.25 | 90.00 | 86.70 | 90.00 | 84.35 |
| | Rice, Vialone (Milano) | 282.30 | 281.30 | 281.30 | 276.15 | 253.00 | 243.35 | 249.30 | 227.80 |
| | Rice, Maratelli (Milano) | 216.90 | 215.90 | 215.90 | 210.95 | 197.35 | 187.05 | 193.60 | 180.20 |
| | †Rice, Originario (Milano) | 185.80 | 184.80 | 184.80 | 179.90 | 166.75 | 157.70 | 163.45 | 149.90 |
| | †Hemp, fibre ⁽¹⁾ | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | 582.35 |
| | †Olive oil "Soprafino locale" (Bari) | 878.25 | 878.25 | 863.25 | 842.80 | 732.65 | 682.35 | 712.00 | 699.00 |
| | †Wine, ordinary, 11° (Bari) per hectolitre ⁽¹⁻²⁾ | ... | ... | ... | 183.00 | 95.05 | 119.85 | 117.60 | 97.55 |
| A II | †Oxen, live weight, 1st quality (Milano) ⁽¹⁾ | 590.00 | 590.00 | 590.00 | 515.00 | 491.10 | 456.65 | 458.30 | 462.10 |
| | Lambs, dead weight (Roma) ⁽¹⁾ | 944.35 | 902.80 | 823.10 | 869.40 | 794.65 | 825.85 | 725.85 | 791.60 |
| | Pigs, live weight (Milano) ⁽¹⁻³⁾ | 780.00 | 780.00 | 780.00 | 700.00 | 582.25 | 529.65 | 537.50 | 599.50 |
| | †Cheese, Parmigiano-Reggiano (Milano) | 1,535.10 | 1,519.80 | 1,504.50 | 1,337.30 | 1,211.50 | 1,183.35 | 1,205.75 | 1,100.00 |
| | Eggs (Milano) per 100 ⁽¹⁾ | 60.85 | 63.55 | 59.54 | 72.60 | 45.15 | 39.70 | 53.20 | 49.45 |
| | Wool, « Roma 2, vissana » (Roma) ⁽¹⁾ | 3,141.00 | 2,602.00 | 2,602.00 | 2,602.00 | 2,602.00 | 2,602.00 | 2,602.00 | 2,602.00 |
| B I | †Superphosphate of lime, 14-16 % (Milano) | 30.10 | 30.10 | 30.10 | 30.10 | 24.75 | 24.75 | 24.75 | 24.35 |
| | Chloride of potash, 50 % (Milano) | 82.50 | 82.50 | 82.50 | 77.90 | 71.50 | 72.35 | 71.50 | 71.10 |
| | †Nitrate of lime, 15-16 % (Milano) | 117.65 | 117.65 | 117.65 | 117.65 | 95.90 | 95.90 | 92.35 | 92.15 |
| | Sulphate of ammonia, 20-21 % (Milano) | 110.10 | 110.10 | 110.10 | 110.10 | 91.10 | 91.10 | 88.10 | 87.75 |
| | †Cyanamide of calcium, 15-16 % (Milano) | 118.00 | 118.00 | 118.00 | 118.00 | 96.75 | 73.15 | 70.23 | 93.90 |
| | †Copper sulphate, 98-99 % (Genova) | 232.50 | 231.50 | 230.50 | 229.50 | 188.50 | 202.00 | 189.30 | 198.00 |
| B II | Wheat-bran (Milano) | 62.85 | 62.85 | 62.85 | 61.65 | 60.00 | 60.00 | 60.00 | 57.15 |
| | Rice-bran (Milano) | 83.00 | 83.00 | 83.00 | 81.75 | 80.00 | 61.25 | 74.35 | 58.75 |
| | Linseed cake (Milano) ⁽¹⁻⁴⁾ | 90.00 | 90.00 | 90.00 | 81.00 | 81.00 | 85.50 | 81.00 | 85.50 |
| | Groundnut cake (Milano) ⁽¹⁻⁴⁾ | 75.00 | 75.00 | 75.00 | 65.00 | 65.00 | 55.00 | 62.00 | 55.00 |
| | †Rapeseed cake (Milano) ⁽¹⁻⁴⁾ | 42.00 | 42.00 | 42.00 | 36.00 | 36.00 | 36.50 | 36.00 | 36.50 |

*. †: see notes on preceding page.

⁽¹⁾ These prices do not include the tax of 2 per cent on sellings, levied as from Feb. 8, 1940. — ⁽²⁾ As from Jan. 1940: prices in Barietta for wine 14°. — ⁽³⁾ Prior Feb. 1938, pigs weighing more than 150 kg.; subsequently, pigs of more than 180 kg. — ⁽⁴⁾ Prices free at factory. — ⁽⁵⁾ Producers' maximum prices. — ⁽⁶⁾ Revised prices: March 22, 1939; Febr. and Jan. not quoted.

| GROUPS | DESCRIPTION | AVERAGE | | | | | | | Agricultural year | |
|---|--|---------|----------|--------|---------|--------|--------|---------|-------------------|--|
| | | June | May | April | Jan.- | April- | April- | 1938-39 | 1937-36 | |
| | | 1940 | 1940 | 1940 | March | June | June | | | |
| | | | | | 1940 | 1939 | 1938 | | | |
| SWEDEN (Prices in Swedish crowns per quintal) | | | | | | | | | | |
| A I | Wheat (Stockholm) | n. q. | • 21.47 | 21.12 | 20.51 | 17.67 | 21.40 | • 17.36 | • 20.15 | |
| | Rye (Stockholm). | n. q. | • 21.47 | 21.22 | 20.63 | 16.67 | 18.67 | • 16.66 | • 18.79 | |
| | Barley | n. q. | n. q. | n. q. | • 17.71 | 13.39 | n. q. | • 13.44 | • 17.97 | |
| | Oats (Stockholm) | n. q. | n. q. | 19.06 | 17.16 | 11.17 | 14.23 | • 11.40 | • 14.68 | |
| A II | Cows, live weight (Stockholm) | ... | 77.00 | 72.00 | 71.67 | 64.67 | 58.35 | 63.17 | 59.10 | |
| | Pigs, live weight (Göteborg) | ... | 109.00 | 105.00 | 103.67 | 98.33 | 99.65 | 102.58 | 98.40 | |
| | Butter (Malmö; prices for the home market) | 300.00 | 300.00 | 300.00 | 300.00 | 275.00 | 267.50 | 271.08 | 267.96 | |
| | Eggs (Stockholm) | 133.00 | 130.00 | 136.00 | 154.17 | 112.33 | 104.67 | 135.92 | 137.20 | |
| B I | Superphosphate, 20 % | 9.80 | 9.80 | 9.80 | 9.80 | 7.30 | 7.55 | 7.25 | 7.37 | |
| | Potash salts, 40 % | 15.60 | 15.60 | 15.60 | 15.60 | 12.55 | 13.10 | 12.32 | 12.72 | |
| | Nitrate of soda, 15 ¼ % - 16 % | 18.90 | 18.90 | 18.90 | 18.90 | 17.25 | 17.65 | 17.45 | 17.39 | |
| | Nitrate cyanamide, 13 ½ % | 17.05 | 17.05 | 17.05 | 17.05 | 16.55 | 16.95 | 16.75 | 16.61 | |
| B II | Maize, Plata. | 18.50 | 18.50 | 18.50 | 18.42 | 18.53 | 16.96 | 17.43 | 16.92 | |
| | Wheat-bran | ... | n. 17.50 | 17.24 | 16.48 | 12.27 | 14.37 | 12.98 | 14.14 | |
| | Groundnut cake | 24.50 | 24.50 | 24.50 | 24.50 | 20.05 | 18.84 | 20.14 | 19.52 | |
| | Cottonseed cake | 23.00 | 23.00 | 23.00 | 23.00 | 19.54 | 17.97 | 19.53 | 18.98 | |
| | Soya meal | 23.00 | 23.00 | 23.00 | 23.00 | 20.57 | 18.68 | 20.35 | 19.08 | |

(1) March: 71.00; February: 72.00. — (2) March: 104.00; February: 103.00.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following explanations refer to crop conditions quoted in the crop notes and in the tables. — Crop condition according to the system of the country: Germany, including Ostmark and Sudetenland, Bohemia and Moravia (Protectorate); Hungary and Luxemburg: 1 = excellent, 2 = good, 3 = average, 4 = poor, 5 = very poor; Finland: 8 = very good, 6 = above the average, 5 = average; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = poor; Estonia, Latvia, Lithuania, Poland, Romania and Sweden: 5 = excellent, 4 = good, 3 = average, 2 = poor, 1 = very poor; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; Portugal: 100 = excellent, 80 = good, 60 = average, 40 = poor, 20 = very poor; Switzerland: 100 = excellent, 90 = very good, 75 = good, 60 = fairly good, 50 = average, 40 = rather poor, 30 = poor, 10 = very poor; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = poor; Canada: 100 = crop condition promising a yield equivalent to the average yield of a long series of years; United States: 100 = crop condition which promises a normal yield; Egypt: 100 = crop condition which promises a yield equal to the average yield of the last five years. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

NOTE: The countries are listed throughout by continents (Europe, followed by the U. S. S. R. America, Asia, Africa and Oceania) in the French alphabetical order. In the tables the Northern Hemisphere precedes the Southern Hemisphere.

See latest information at the end of the Crop Report.

VEGETAL PRODUCTION

THE WHEAT CROP IN 1940

At this period of the year, the Institute normally possessed all necessary information to give a reliable summary of the probable results of the wheat crop in the Northern hemisphere. This year, owing to the present circumstances, information concerning the outturn of the crops is lacking for numerous producing countries or it arrives to the Institute with great delay; which makes it extremely difficult to give an exact and complete estimate of the total amount of the crop in the various continents and on the whole.

Consequently we limit ourselves to summarize information coming from different sources, with the purpose of reaching general conclusions, when the elements of judgment seem to be sufficient.

As regards Europe, lacking all base of statistical estimate for some of the main producing countries, we are compelled to rely upon information of a general character which agree in marking out a notably deficient production of wheat in 1940. The decrease of sowings on account of the unfavourable autumn, the severe and protracted winter, the rainy spring and the wet, misty and stormy beginning of summer with often too cool temperatures, the deficient labor due to military mobilisation, form so many factors which contributed to keep both the unit-yield and the total volume of 1940 crop on a low level.

The most deficient results are forecast for the Danubian basin, where crops, in addition to the above mentioned causes of deterioration, suffered from serious floods towards the end of spring and excessive rainfall during the last phase of vegetation. Bulgaria, Hungary, Romania and Yugoslavia which in 1939 and 1938 had obtained in general excellent wheat crops, fluctuating around 450 million bushels, will hardly attain an amount of 330 million in 1940, even without taking into account the recent modifications of frontiers. Such an amount would be strictly necessary to assure the normal internal requirements of these countries. It may be possible, however, that the expected abundant production of maize on notably increased acreage in those countries where maize has a large share in human consumption, will allow rather important quantities of wheat to be available for export.

The countries of the Mediterranean basin (Italy, Spain, Greece and Portugal) show from one country to another, rather irregular crops, generally somewhat inferior to those of 1939, except in Spain, where the outturn is better than the very deficient one of 1939, without however attaining the average production of the years preceding the Civil War. In this group of countries as a whole, the crop may be estimated at about 440 million bushels, being practically equal to the average of 1934-1938, but remaining about 20 million bushels below that of last year.

As regards the countries of the central European zone from France to the Soviet frontier, it is not easy to make a definite statement about the probable issue of their crops, most of those countries having interrupted since the outbreak of the war all information about the cultivated areas, crop condition and weather conditions. Some information published by the commercial press, the course of the season and the situation directly or indirectly created by the hostilities, allow to presume that their total production in 1940 will be definitely inferior to that of last year, which was about average.

The wheat production in these countries (France, Germany, Belgium, the Netherlands, Luxemburg, Switzerland, the Protectorate of Bohemia-Moravia, Slovakia and the territories of Poland within their former frontiers) was about 650 million bushels in 1939 and 660 millions in the 1934-1938 average.

The hypothesis which seems to correspond most approximately to the real state of facts is that of a production 15 per cent. inferior to the above indicated average, which would mean an amount of about 560 million bushels. These countries are the most important rye producers in the continent, because taken altogether they cultivate about $\frac{3}{4}$ of the whole area of rye crop in Europe, with a production of 700 million bushels in 1939, on a European total of 920 millions. This year rye crops resisted much better than wheat crops to adverse weather conditions and the production is not expected to be notably inferior to the average and may be even slightly better.

As regards the countries of the northern zone (United Kingdom, Ireland, Denmark, Sweden, Norway, Finland and Baltic countries) available information for the Scandinavian and Baltic countries indicate that the excessively dry and rather cold summer was not favourable to the growth of crops which allow to

Cereal Production.

| COUNTRIES AND PRODUCTS | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | % 1940 | |
|---------------------------|------------------|------------|----------------------------|------------------|-------------|----------------------------|---------------|------------------|
| | Thousand centals | | | Thousand bushels | | | 1939 = 100 | Average = 100 |
| WHEAT | | | | | | | | |
| Spain | * 72,753 | 63,447 | (1) 93,264 | * 121,252 | 105,742 | (1) 155,437 | 114.7 | 78.0 |
| Greece. | 20,503 | 22,975 | 16,616 | 34,171 | 38,291 | 27,693 | 89.2 | 123.4 |
| Hungary | (2) 46,813 | (3) 67,862 | (4) 48,933 | (2) 78,020 | (3) 113,102 | (4) 81,554 | — | — |
| Italy | 160,938 | 175,929 | 160,487 | 268,225 | 293,210 | 267,474 | 91.5 | 100.3 |
| Romania | (5) 36,402 | 98,169 | 74,044 | (5) 60,669 | 163,611 | 123,404 | — | — |
| Slovaquia | 7,527 | 8,400 | — | 12,546 | 13,999 | — | 89.6 | — |
| Canada | ((w)(6) 10,094 | 13,363 | 8,437 | (6) 16,823 | 22,271 | 14,061 | 75.5 | 119.6 |
| United States | ((s)(6) 255,349 | 280,411 | 149,630 | (6) 425,581 | 467,352 | 249,383 | 91.1 | 170.7 |
| Mexico | ((w) 333,581 | 338,059 | 335,654 | 555,969 | 563,431 | 559,423 | 98.7 | 99.4 |
| India | ((s) 122,792 | 114,924 | 94,772 | 204,654 | 191,540 | 157,954 | 106.8 | 129.6 |
| Turkey | 7,740 | 8,863 | 6,932 | 12,900 | 14,771 | 11,553 | 87.3 | 111.7 |
| Egypt | (7) 239,098 | 220,013 | 219,475 | (7) 398,496 | 366,688 | 365,792 | 108.7 | 108.9 |
| | 102,074 | 101,587 | 75,101 | 170,121 | 169,309 | 125,165 | 100.5 | 135.9 |
| | 29,885 | 29,406 | 26,102 | 49,807 | 49,009 | 43,502 | 101.6 | 114.5 |
| RYE | | | | | | | | |
| Spain | * 15,432 | 9,045 | (1) 10,981 | * 27,558 | 16,152 | (1) 19,608 | 170.6 | 140.5 |
| Greece. | 1,275 | 1,376 | 1,248 | 2,278 | 2,457 | 2,229 | 92.7 | 102.2 |
| Hungary | (2) 16,771 | (3) 19,042 | (4) 15,361 | (2) 29,948 | (3) 34,004 | (4) 27,430 | — | — |
| Romania | (5) 3,803 | 9,513 | 8,625 | (5) 6,791 | 16,987 | 15,401 | — | — |
| Slovaquia | 4,991 | 4,894 | — | 8,912 | 8,740 | — | 102.0 | — |
| Canada | ((w)(6) 5,864 | 6,820 | 3,065 | (6) 10,472 | 12,178 | 5,473 | 86.0 | 191.3 |
| United States | ((s)(6) 1,615 | 1,752 | 894 | (6) 2,884 | 3,129 | 1,597 | 92.2 | 180.6 |
| Turkey | 20,973 | 21,979 | 23,115 | 37,452 | 39,249 | 41,276 | 95.4 | 90.7 |
| | 11,464 | 9,396 | 7,579 | 20,472 | 16,779 | 13,534 | 122.0 | 151.3 |
| BARLEY | | | | | | | | |
| Spain | * 44,093 | 31,048 | (1) 48,808 | * 91,861 | 64,685 | (1) 101,684 | 142.0 | 90.3 |
| Greece. | 5,280 | 4,877 | 4,336 | 11,001 | 10,160 | 9,034 | 108.3 | 121.8 |
| Hungary | (2) 15,642 | (3) 17,407 | (4) 13,402 | (2) 32,588 | (3) 36,265 | (4) 27,922 | — | — |
| Romania | (5) 14,674 | 17,999 | 22,736 | (5) 30,572 | 37,498 | 47,367 | — | — |
| Slovaquia | 6,028 | 5,864 | — | 12,559 | 12,218 | — | 102.8 | — |
| Canada | (6) 49,899 | 49,511 | 38,880 | (5) 103,957 | 103,147 | 81,001 | 100.8 | 128.3 |
| United States | 139,110 | 132,623 | 98,233 | 289,812 | 276,298 | 204,652 | 104.9 | 141.6 |
| Turkey | 50,045 | 50,601 | 43,218 | 104,262 | 105,420 | 90,040 | 98.9 | 115.8 |
| Egypt | 5,315 | 5,251 | 4,951 | 11,073 | 10,939 | 10,316 | 101.2 | 107.3 |
| OATS | | | | | | | | |
| Greece. | 3,840 | 3,343 | 2,479 | 12,001 | 10,447 | 7,748 | 114.9 | 154.9 |
| Hungary | (2) 9,647 | (3) 8,067 | (4) 5,944 | (2) 30,148 | (3) 25,209 | (4) 18,574 | — | — |
| Romania | (5) 10,032 | 10,736 | 13,140 | (5) 31,349 | 33,548 | 41,061 | — | — |
| Slovaquia | 4,192 | 3,439 | — | 13,100 | 10,747 | — | 121.9 | — |
| Canada | (6) 130,132 | 130,698 | 110,640 | (6) 406,663 | 408,432 | 345,752 | 99.6 | 117.6 |
| United States | 358,918 | 299,909 | 304,176 | 1,121,619 | 937,215 | 950,551 | 119.7 | 118.0 |
| Turkey | 7,937 | 6,512 | 4,842 | 24,802 | 20,351 | 15,132 | 121.9 | 163.9 |

(w) Winter crop. — (s) Spring crop. — (1) Total: Winter crop and Spring crop — * Unofficial estimate.

(1) Average 1934 to 1936. — (2) Including the reannexed northern zone and the Subcarpathia. — (3) Including the reannexed northern zone but excluding the Subcarpathia. — (4) Territory as at the end of 1937. — (5) Not including Bessarabia and North Bucovina. — (6) Conjectural estimate based on crop condition on July 1 and longtime average yield. — (7) Second estimate.

forecast returns below the average. In the United Kingdom too it seems that the unit-yield will be rather poor owing to the unfavourable course of the season, but it is probable that the total amount of the harvest may attain that of last year, thanks to the increase of the cultivated areas. In Ireland prospects are good. As a whole these various countries harvested 150 million bushels last year and 136 millions in the preceding five years average. Their production in 1940 should not be inferior to 130 million bushels.

In conclusion, according to these various estimates of a conjectural character, the production of wheat in 1940 should reach an approximately estimated amount of about 1,460 million bushels, with a decrease of 240 millions, that is 14 per cent. of the 1939 production and of 125 millions, that is 8 per cent. of the preceding five-years average, in all European countries combined, except the U. S. S. R. (within the frontiers of 1939, that is without taking into consideration the territorial changes which occurred recently following the incorporation of certain regions into the U. S. S. R., as these changes cannot be taken into account without weakening the base of the statistical comparisons). The poorest crops recorded in Europe during the last ten years were those of 1931 (1,430 million bushels), of 1936 (1,480 millions) and of 1932 (1,490 millions). Nevertheless before 1931 all crops were always definitely below 1,470 million bushels. The Department of Agriculture of the United States has published in July a forecast of the 1940 European wheat production, which is also necessarily based on conjectural data for most countries of the continent. It indicates an amount of 1,360 million bushels, showing a difference of about 100 million bushels less than our own estimate. The very nature of these calculations justifies the divergency in the results.

In the Soviet Union the weather was not very favourable to cereals crops during spring and summer; nevertheless the results of the harvest are judged favourable by the competent authorities and in several regions of large production unit-yields appear high. In the important south-eastern regions, where during the last years, crops had often been seriously jeopardized by drought, yields were good this year.

In North America crop prospects have been slightly modified in July. In the United States the estimate of the winter wheat crop showed a considerable increase; that of spring wheat remained practically the same; on the whole it was increased from 729 million bushels in July to 761 millions in August. Thus the crop is superior by little to the production obtained last year (755 million bushels) and surpasses by about 6 per cent. the previous five years average. Relying upon a domestic consumption of about 675 million bushels, the new crop represents an exportable surplus of about 86 million bushels; the old wheat stocks existing in the country at the beginning of the current season are estimated at 280 million bushels, against 254 millions on 1 July 1939 and an average of 160 millions during the last five seasons. In Canada July rains were irregular and generally insufficient, causing a deterioration of the crops. Wheat production, which was forecasted a month ago at 375 million bushels has undergone a decrease, the importance of which is not available, the official report on crop condition at August 1 having not yet reached the Institute.

For the Asiatic countries, the results of the Indian crops have been known since long; they figure among the best of the last years, but the definite estimate, which is generally a rectification of little importance, has not yet reached the Institute. Turkey, the cereal crop forecast of which has just been published, announces this year abundant productions—that of wheat is even judged a little superior to that of 1939 which had been the highest recorded up to the present. According to information of commercial source the crops of Syria and Palestine are equally very satisfactory. On the other hand in most countries of the Far-East the wheat crop is expected to be little abundant, China and Japan having had results below the average, owing to the protracted drought of last spring which injured the yields in important regions of production. As to North Africa no estimate on countries of the French section is available, but some information of a general character let presume that the crop is satisfactory. The yield of Egypt, according to the first estimate, appears to be abundant, exceeding the plentiful production of last year. Egypt will thus have at her disposal large amounts of wheat which are superior to her domestic needs.

Wheat prospects of this year in the northern hemisphere may be summarized by saying that they appear deficient in Europe and in the Far-East, whereas on the whole in other regions they are notably similar to the good harvest of 1939.

With respect to countries of the southern hemisphere, where the last sowings are being ended, an increase in acreage is anticipated in Argentina, where in general the wet season was not favourable to the sowings and to the first growth. A slight reduction of grain-growing areas is foreseen in Australia where on the contrary persistent drought conditions hindered labours and threatens the germination of seed. Nearly all the States of the Dominion are longing for abundant rains.

G. C.

CURRENT INFORMATION FROM VARIOUS COUNTRIES ON WHEAT, RYE, BARLEY AND OATS.

Bulgaria: Rainy and cold weather in the spring and early summer not only hindered the normal growth of winter cereals, but also caused floods and consequently destruction of sowings on a large scale, especially in northern regions. Such unfavourable atmospherical conditions also caused a stop in the growth of spring cereals. Yet less rainy and warmer weather in the second half of June brought about a considerable improvement of the crop condition. But abundant hail falls during this period caused new ravages to cereals.

Nevertheless fine, warm and almost dry weather which followed in July created very favourable conditions for the ripening of cereals and housing operations. At the beginning of August these operations of winter cereals were finished in the south of the country, whereas in the North they were in full swing. According to the first unofficial results, the wheat crop is expected to be below the previous five years' average, whereas rye, barley and oats crops are estimated slightly above the same average.

Denmark: The weather of the last weeks of July was characterized by a falling down of temperature and rains.

Cereals crop, especially that of spring cereals, had begun in bad conditions because of wind and rains.

Production of straw is not abundant.

The cereals condition expressed in the system of the Institute was the following

| | August 1, 1940 | July 1, 1940 | August 1, 1939 |
|------------------|-------------------|-----------------|-------------------|
| Wheat | 67 | 69 | 92 |
| Rye | 86 | 84 | 90 |
| Barley | 86 | 87 | 85 |
| Oats | 84 | 82 | 87 |
| Meslin | 82 | 81 | 85 |

Greece: Frequent rains and coolish weather in June and July were unfavourable to the growth and ripening of cereals. Consequently previsions of abundant wheat and rye crops or at least crops superior to those of last year have not been realized, in spite of the considerable increase of their areas. Spring cereals as barley and oats gave much more satisfactory returns.

Hungary: In the first week of July, weather was cool in comparison with the saison. Sunny and warm days were considerably below the average. The quantities of atmospheric precipitations were above the average on two thirds of the country's surface. In most places rains varied from the average to the double of average. During 14 days it rained almost every day in the one or the other part of the country. Rainfall was general during two days of the period in consideration. Atmospheric precipitations had no character of stormy rains. Hail was only sporadic.

At the end of July crops of wheat, rye, autumn and spring barley had everywhere come to an end, except in some places. Oats crop began already. Works of cereals housing and threshing are going on rapidly. According to reports concerning the results of threshings the averages foreseen for the production of wheat decreased in some Counties. In several places there is a complaint about the fact that sheaves are so damp that the grains are beginning to germinate. In some other places ears are somehow pressed especially among wheat overthrown by the wind. In addition, because of too frequent rains, the colour of the grains is not satisfactory. Housing and mowing are advancing.

At the end of July threshings were going on in many regions. In several regions results of threshing appear to be below the previsions.

The specific weight of wheat is variable from 78-80 kgs. An average wheat crop is expected.

The rye crop has been harvested almost everywhere. Housing and threshing are at an end. Grains are sufficiently full and big. Stubbles have an average length. At present a rye crop below average is expected.

Autumn barley crop is finished. Grains are sufficiently full, but decoloured because of an abundance of atmospheric precipitations.

At present a poor return in autumn barley is expected.

Results of the threshing of spring barley appear to be below the previsions concerning the quality. Owing to the too frequent rains considerably surpassing the greatest quantities recorded until now, the grains, though sufficiently heavy, especially the beer-barley, are decoloured.

A crop of spring barley from good to average is expected at present.

Prospects of oats yield have improved again since last month. Grains are well grown up and full, straw is sufficiently abundant and high. At present the production of oats is estimated from good to average.

Areas sown to cereals.

| COUNTRIES | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | |
|-------------------------|--------------------|--------------------|----------------------------|---------------|------------------|------------------|------------------|----------------------------|--------------------|-------------------|--|
| | | | | 1939 = 100 | Average = 100 | | | | 1939 = 100 | Average = 100 | |
| | ooo acres | | | | | | ooo acres | | | | |
| | WHEAT | | | | | | RYE | | | | |
| Greece | 2,636 ¹ | 2,356 ¹ | 2,072 ¹ | 111.9 | 127.2 | 165 ¹ | 156 ¹ | 170 ¹ | 105.4 ¹ | 96.9 ¹ | |
| Hungary | (1) 4,313 | (2) 4,626 | (3) 3,926 | — | — | (1) 1,624 | (2) 1,718 | (3) 1,558 | — | — | |
| Lithuania | w) 346 | 364 | 381 | 94.9 | 90.7 | 1,248 | 1,222 | 1,246 | 102.2 | 100.1 | |
| Luxembourg | w) 35 | 38 | 45 | 91.1 | 76.2 | 16 | 18 | 18 | 89.8 | 89.2 | |
| Romania | (4) 4,564 | 10,079 | 8,560 | — | — | (4) 426 | 1,107 | 1,037 | — | — | |
| Canada | (5) 711 | (6) 735 | (6) 590 | 96.7 | 120.5 | (5) 738 | (6) 891 | (6) 565 | 82.8 | 130.7 | |
| United States | (7) 27,535 | 26,021 | 24,451 | 105.8 | 112.6 | (7) 209 | 211 | 168 | 99.1 | 124.2 | |
| India (8) | w) 34,922 | 37,802 | 40,498 | 92.4 | 86.2 | 3,086 | 3,811 | 3,363 | 81.0 | 91.8 | |
| — | s) 17,758 | 15,894 | 15,058 | 111.7 | 117.9 | — | — | — | — | — | |
| Egypt | 1,563 | 1,501 | 1,452 | 104.1 | 107.6 | — | — | — | — | — | |
| | BARLEY | | | | | | OATS | | | | |
| Greece | 547 | 532 | 511 | 102.8 | 107.1 | 443 | 373 | 339 | 118.7 | 130.6 | |
| Hungary | (1) 1,300 | (2) 1,321 | (3) 1,135 | — | — | (1) 793 | (2) 633 | (3) 542 | — | — | |
| Romania | (4) 1,604 | 2,708 | 3,857 | — | — | (4) 1,406 | 1,455 | 1,910 | — | — | |
| Canada | (7) 4,484 | 4,347 | 4,144 | 103.1 | 108.2 | (7) 12,880 | 12,790 | 13,435 | 100.7 | 95.9 | |
| United States | 13,290 | 12,546 | 9,555 | 105.9 | 139.1 | 34,585 | 33,574 | 34,715 | 103.0 | 99.6 | |
| Egypt | 278 | 273 | 280 | 101.9 | 99.2 | — | — | — | — | — | |

w) Winter crops. — s) Spring crops. — (1) Including the reannexed northern zone and the Sub-Carpathia. — (2) Including the reannexed northern zone but excluding the Sub-Carpathia. — (3) Territory as at the end of 1937. — (4) Not including Bessarabia and the Northern Bucovina. — (5) Area indicated for harvest. — (6) Area harvested. — (7) Farmers' intentions to plant. — (8) Fourth estimate.

Portugal: Weather conditions accompanying the wheat crop during the present season were unfavourable. Formation of grains especially, hindered by such conditions, was rather reduced throughout the country.

Condition of rye crop in June let foresee a production below average.

The area sown with wheat in 1939, according to the most recent official estimates, amount to 1,248,000 acres, against 1,134,000 acres in 1938 and an average of 1,304,000 acres in the preceding five years; reports 110.1 and 95.7. Production obtained in 1939 is estimated at 11,378,000 centals (18,962,000 bushels), surpassing 20 per cent. that of 1938 (9,481,000 centals, 15,802,000 bushels) and 11.3 per cent. the average crop of the preceding five years (10,221,000 centals, 17,035,000 bushels).

Romania: During the first week of August it rained in almost all the country, considerably lowering the temperature. During the following week, from 7 to 14 August, weather was rather fine; in the Tinut Olt (a large administrative region in the neighbourhood of the river Olt) and in the valley of the Danube a lack of atmospheric precipitations was felt.

Operations of yield and threshing were hindered partly by the rainfall, but mainly by lack of agricultural mechanicians, draft animals and carriages.

According to the results of threshing, the quality of wheat shows to be very unsatisfactory in Muntenia and Oltenia, where the specific weight is about 70 kilogrammes per hectolitre. The quality is poor also in Dobroudja and Bamat, whereas it is much more satisfactory in Moldavia (77 kg./hl.) and in Transylvania (78 kg./hl.).

In the following table of cereals we are publishing the first statistical data relating to the present territory of Romania, excluding Bessarabia and Northern Bucovina. Corresponding official data for 1939 and the 1934-38 period being not yet available, in order to better characterize the results of this year's harvest, we have approximately estimated the area and the production of cereals for 1939. The following table includes the first official estimate of Romania for 1940 and the figures calculated for 1939.

| | Area | | Production | | | |
|------------------|------------------------|-------|--------------------------|--------|--------------------------|---------|
| | thousand acres 1940 | 1939 | thousand centals 1940 | 1939 | thousand bushels 1940 | 1939 |
| Wheat | 4,564 | 7,636 | 36,402 | 80,879 | 60,669 | 134,796 |
| Rye | 426 | 585 | 3,803 | 5,644 | 6,791 | 10,079 |
| Barley | 1,604 | 1,679 | 14,674 | 13,036 | 30,572 | 27,158 |
| Oats | 1,406 | 1,330 | 10,032 | 10,025 | 31,349 | 31,327 |

United Kingdom: At the beginning of July the wheat crop was expected to be about as large as last year, the larger acreage offsetting the damage from the most severe winter in years.

Slovakia: Results of cereal crop are satisfactory for rye, barley and particularly for oats, but less satisfactory for wheat (see the table of cereals). The poor return of wheat is due to the frequent rains of the last period and the irregular and hindered ripening. Consequently the harvest in southern Slovakia could be started only towards mid-July and even only towards the end of July in other regions.

Sweden: The condition of cereal crop on 15 July 1940 in comparison with that of the corresponding period of 1939 was the following:

| | 15 July 1940 | 15 July 1939 |
|------------------------|-----------------|-----------------|
| Winter wheat | 62 | 112 |
| Spring wheat. | 81 | 94 |
| Winter rye. | 88 | 102 |
| Spring rye. | 80 | 92 |
| Barley | 92 | 98 |
| Oats | 94 | 100 |
| Meslin | 85 | 96 |

Switzerland: Rainy and stormy weather during the month of July brought on showers in several cereal fields. But this happened rather late so that the crop will not suffer too much. Rust caused damages as well, but it did not rage everywhere and it appeared relatively late. On the whole, cereals condition in autumn has still a little improved. Already available are the first results of the treshing of rye and barley, which, where crops were about normal, show to be above the average. As for winter wheat and the other cereals, with the exception of the too thinsown fields, they allow to hope for satisfactory crops. Spring wheat and particularly oats have a very good aspect.

The following is a table of crop conditions prepared, according to the system in use in the country, on a basis of an abundant crop = 100:

| | August 1, 1940 | July 1, 1940 | August 1, 1939 |
|-------------------------|-------------------|-----------------|-------------------|
| Autumn wheat | 70 | 68 | 78 |
| Spring wheat | 79 | 77 | 75 |
| Autumn rye | 74 | 72 | 78 |
| Spring rye | 75 | 79 | 77 |
| Autumn barley | 72 | 70 | 79 |
| Spring barley | 79 | 80 | 74 |
| Oats | 85 | 81 | 80 |
| Meslin | 75 | 76 | 79 |
| Spelt | 76 | 74 | 77 |

Yugoslavia: The protracted and rather cold winter, the very rainy spring as well as the beginning of summer rather damp and not very hot have created unfavourable circumstances to the cereals and especially the wheat vegetation in almost the whole country.

The reduction of surfaces sown to cereals due to the spring floods, the quality of wheat getting worse because of the excessive dampness and the reduced number of sunny days during the ripening period, promised a rather bad crop for the present year, with regard to the quantity as well as to the quality.

Also the atmospheric conditions of July were favourable neither to wheat ripening nor to the operations of cereals housing.

The first threshing results confirm these pessimistic prospects relative to wheat production, which is expected to be inferior from 25 to 30 per cent. to that of last year, whereas crops of rye, oats and especially barley are expected to be a little more satisfactory.

The maximum prices of wheat, which were fixed by the 24 June decree to 230 dinars per quintal, have been later raised to 270 dinars, whereas on the free market prices have gone through a great rise (up to 400 dinars per quintal), owing to the great demand and the delay of the arrival of the last wheat crop on the markets.

U. S. S. R.: Atmospheric conditions in spring and summer were not in general very favourable to the growth of cereals. In spite of that, the crop of this year is expected to be good. In many regions of the Ukraine, North Caucasus, Siberia and Kazakhstan unit-yield of cereals reached from 1,338 to 1,784 pounds per acres. Also the South-West regions, generally suffering from drought, this year have given good unit-yields.

On August 10, that is more than a month after their beginning, harvesting operations are finished in some southern regions. In the Kolkods of North Caucasus, Crimea and the southern part of the Ukraine they had almost come to an end, whereas in the South-West regions, Siberia and the centre of the Union, crop operations were in full swing.

On August 10, cereals harvest was carried on throughout the Union on 109,341,000 acres, representing 51.0 per cent. of the total figures established by the Plan, against 125,947,000 acres (60.0 per cent.) of last year at the same period. Threshing was finished, for the obtained crops, on 55,323,000 acres, that is 51.0 per cent. of the area on which the harvest had been carried on at the same period; last year the corresponding figures were 79,080,000 acres and 63.0 per cent.

These figures show that harvest and threshing operations are late this year as compared with last year's. The delay was caused mainly by the later ripening of ce-

reals during the current year. At any rate the rhythm of housing operations of cereals was remarkably quickened during the last days.

Rainfall in early August in many North-West and even North-East regions of the Union was very favourable to sowing operations of winter cereals, which already started in some places of the regions of Siberia, and East and North-West territory of the Union (European section). This year the Kolkods of the entire Union are compelled to sow more than 84,017,000 acres with winter rye and winter wheat. According to recent dispositions selected seed or improved seed of local varieties must be used this year for winter cereals sowings.

Argentina: Rainy weather in the last two months hindered tillage and sowing operations of cereals. The last official report of August 2 shows that the condition of wheat crop in the North of the cereals region was inferior to normal and somewhere there was to complain about a spread of rust.

Canada: At the middle of July, crop prospects in the Prairie Provinces were moderately improved with cooler weather and fairly general showers and rains. Although crop conditions were poor in northern Manitoba, in central and southwestern Saskatchewan and parts of southern Alberta, no large area was yet affected by total crop failure. Elsewhere over the Prairies, crop conditions were generally good, but timely and well distributed precipitation was required to maintain the same prospects. In southern Manitoba wheat was filling well. In Saskatchewan, about ninety per cent. of the wheat was headed. Although from sixty to eighty per cent. of the crop in southern Alberta had headed, in other sections of the province much grain was late. Harvesting of winter rye was expected to commence in southwestern Manitoba about July 20.

Chile: In the following table are given the first estimates of cereals area and production in 1939-40, compared with the final figures for 1938-39 and the average of 1933-34 to 1937-38. For the rye, which is a recent crop, average refers at years 1935-36 to 1937-38.

| | 1939-40 | 1938-39 | Average 1933-34 to 1937-38 | % 1939 40 1938-39 = 100 | % 1939 40 Average = 100 |
|--------------------------------|---------|---------|----------------------------------|-------------------------------|-------------------------------|
| <i>Area.</i> | | | | | |
| (thousand acres) | | | | | |
| Wheat | 2,047 | 2,044 | 1,990 | 100.1 | 102.9 |
| Rye | 32 | 35 | (28) | 91.8 | (113.8) |
| Barley | 132 | 203 | 193 | 65.1 | 68.4 |
| Oats | 266 | 337 | 249 | 78.8 | 106.7 |
| <i>Production.</i> | | | | | |
| Wheat (ooo centals) | 19,194 | 21,307 | 18,738 | 90.1 | 102.4 |
| (ooo bushels) | 31,989 | 35,510 | 31,229 | | |
| Rye (ooo centals) | 128 | 202 | (175) | 63.4 | (72.8) |
| (ooo bushels) | 228 | 360 | (313) | | |
| Barley (ooo centals) | 1,684 | 2,402 | 2,627 | 70.1 | 64.1 |
| (ooo bushels) | 3,507 | 5,004 | 5,473 | | |
| Oats (ooo centals) | 1,860 | 3,367 | 2,213 | 55.3 | 84.3 |
| (ooo bushels) | 5,813 | 10,520 | 6,915 | | |

United States: During the week ended July 24 threshing and harvesting of the wheat crop was proceeding in good conditions. During the following week showers were reported in the northern parts of the Great Plains and in the Lake region, but weather was mostly hot and dry elsewhere. Winter wheat harvest was almost finished and spring wheat harvest was progressing generally under favourable weather condition. During the week ended August 7, beneficial showers improved late crops in some sections but in others rains was urgently needed. Threshing of winter wheat crop was nearly finished and harvesting of spring wheat was well advanced in the southern half of the wheat belt. Oats harvesting was being rushed. The week ended August 14 was featured by tropical storms all along the south Atlantic coast and the western coast of the Gulf, resulting in excessive rainfall. Plentiful rain also relieved several drought areas, but was still urgently needed in many sections, especially in the Ohio valley, the northern half of the Great Plains and Oklahoma. Late spring wheat harvest advanced under favourable weather. During the week ended August 21, moderate to heavy rainfall in many Central sections benefited late crops, but it was excessive in Virginia and the Carolinas, causing considerable damage and destruction. Threshing of small grains was delayed in some sections, but good progress was made in other.

Mexico: According to the information of the press the production of cereals in 1940 did not reach the level which could be expected owing to the increase of the cultivated area. The poor returns of this year are due to ravages caused to the crop by rust.

Turkey: According to the most recent estimates, the figures of crops of meslin and spelt in 1940, as compared respectively with those of 1939 and the average of the preceding five years are the following.

| PRODUCTS | 1940 | 1939 | Average 1934-1938 | 1940 | 1939 | Average 1934-1938 | % 1940 | |
|------------------|------------------|-------|----------------------|------------------|-------|----------------------|---------------|------------------|
| | | | | | | | 1939 = 100 | Average = 100 |
| | Thousand centals | | | Thousand bushels | | | | |
| Meslin | 4,057 | 3,256 | 2,076 | 6,994 | 5,614 | 3,580 | 124.6 | 195.4 |
| Spelt | 2,425 | 2,736 | 1,955 | 6,063 | 6,840 | 4,886 | 88.6 | 124.1 |

Australia: About the middle of July, dry weather was still persistent over a wide area and germination had been very poor. Although real drought conditions were not yet prevailing, the lack of sufficient precipitation had done considerable damage to seeded crops. The month of May especially was a dry month with only 50 per cent. of normal rain.

CURRENT INFORMATION ON MAIZE.

Bulgaria: Wet weather in June was very favourable to the growth of maize, the crop condition of which at the end of June was very good. The warmer and more dry July favoured the ripening of maize grains, but towards the end of July the crop began to need moisture. The return of rainy and cool weather towards the end of July and at the beginning of August saved the situation, bringing a considerable improvement to the maize crop. This year an increase of the area sown with maize is expected, owing to the fact that a part of the destroyed areas of winter cereals was sown again with maize.

Greece: Frequent rainfall during the months of June and July was generally favourable to the vegetation of maize.

Hungary: Maize is growing in good conditions. Earling is very good in most part of the regions. Only in countries with wet soil growth is not sufficient and the crop will be poor.

According to the first official estimate, maize production of Hungary (the present territory including the Northern reembodyed section and Sub-Carpathia) is of 68,218,000 centals (121,818,000 bushels). In 1939, on the territory including the northern reembodyed section, but excluding Sub-Carpathia, the production was of 51,468,000 centals (91,907,000 bushels) and, during the five years period 1934-1938, on the Hungarian territory at the end of 1937, it attained 50,840,000 centals (90,787,000 bushels).

Italy: Previsions of an exceptionally favourable maize crop during the current season are confirmed, thanks to the course of the season which was very propitious to the crop even during the month of July.

This crop needs a dry, warm and sunny weather.

Portugal: Maize condition in June could be considered as rather good throughout the country. However, crops needed sunny and warmer weather until yield time.

According to official estimates, maize production in 1939 is estimated at 8,041,000 centals (14,359,000 bushels), against 6,531,000 centals (11,662,000 bushels) obtained in 1938 and an average of 6,794,000 centals (12,133,000 bushels) during the previous five years; reports: 123.1 and 118.3. The good production of 1939 was obtained on an area of 977,000 acres; this data almost coincides with that of 1938 (971,000 acres), but it is 5.7 per cent. inferior to the average area in the previous five years (1,036,000 acres).

Romania: Maize weeded in good time has much improved after the abundant rainfall at the beginning of August. After the cession of Bessarabia and Northern Bucovina, the area of Romania sown with maize decreased about 22 per cent. and the production about 19 per cent. According to the first official estimate, the area sown with maize this year is of 9,904,000 acres, against the figure approximately calculated of 9,589,000 acres in 1939. The corresponding figures for the production are 79,528,000 centals (142,015,000 bushels) this year and 113,685,000 centals (203,010,000 bushels) in 1939.

Yugoslavia: In spite of last spring frequent rains, which have hindered and delayed the sowing operations of maize until the beginning of June, the condition of this plant was fairly good about the middle of June and the crop was expected to give good results.

The persisting damp weather also during the second half of June and the whole month of July was still favourable to the maize; its production is expected to be rather abundant, so much the more as the area sown with maize in the present year exceeds that of last year, because the cereals area, damaged by the spring floods, could be employed.

Argentina: Maize crop area during the season 1939-40, according to the Ministry of Agriculture in Argentina, reaches 14,340,000 acres, against 8,654,000 acres in 1938-39 and an average of 10,997,000 acres during the five preceding years; reports 165.7 and 130.4. The sown area in 1939-40 was of 17,792,000 acres; thus the difference between the two areas is of 3,452,000 acres, of which 1,483,000 acres were destroyed by the unfavourable weather conditions and the remaining 1,969,000 acres were destined to pasture-land for livestock. The abnormally high proportion of pastured maize

fields during the current season is the result of low prices of product which in several zones having a production inferior to the average, did not compensate for the production cost.

Nevertheless, as we published in the official report of June, maize crop in 1939-40, estimated at 234,573,000 centals (418,881,000 bushels), exceeds all productions obtained in the country until now, with the exception of the record-crop of 1934-35, and coincides with the exceptionally abundant crop of 1930-31.

The last official report of August 2, however, shows that the excessive rains in July had an unfavourable influence on the drying and shelling of maize.

United States: During the week ended July 24 some deterioration occurred in the Western half of the maize belt, especially Kansas, due to hot, and dry weather, but elsewhere crop conditions were generally very favourable. During the following week weather was mostly hot and dry and the maize crop was deteriorating in the drier areas. Drought was also predominant during the week ended August 7, and rain was urgently needed in general. During the week ended August 14, maize suffered from drought in the Eastern half of the belt, but conditions were somewhat relieved in the Western half, following plentiful rain. During the week ended August 21, drought damaged in the Upland much of the maize crop beyond recovery, but conditions improved in the heavy districts by rains.

The production of maize in 1940 is estimated at 1,259,018,000 centals (2,248,246,000 bushels) against 1,466,717,000 (2,619,137,000) in 1939 and an average of 1,174,369,000 (2,097,088,000) in 1934 to 1938; percentages, 85.8 and 107.2.

Turkey: The production of maize in 1940 is estimated at 16,094,000 centals, (28,739,000) against an average of 12,309,000 (21,980,000) in 1934 to 1938; percentage 130.7.

CURRENT INFORMATION ON RICE.

United States: During the first week of August rice crop was making good progress.

The production of rice in 1940 is estimated at 24,782,000 centals (55,071,000 bushels) against 23,538,000 (52,306,000) in 1939 and an average of 21,078,000 (46,839,000) in 1934 to 1938; percentages, 105.3 and 117.6.

Turkey: The production of rough rice in 1940 is estimated at 1,556,000 centals (3,457,000) against 1,856,000 (4,124,000) in 1939 and an average of 2,082,000 (4,626,000) in 1934 to 1938; percentages, 83.8 and 74.7.

CURRENT INFORMATION ON POTATOES.

Denmark: The crop condition of potatoes expressed in the system of the Institute, was 91 on August 1, 1940, against 89 on July 1, 1940 and 97 on August 1, 1939.

Hungary: Crop of early potatoes is finished. They give many well grown and sound tubercles. In heavy soils the crop suffered from persistent moisture and in some places an increase of the number of rotten tubercles is to be feared. Late varieties have a satisfactory appearance and are still in flower. Stems are strong, tubercles are numerous, foliage is abundant. Also this crop needs warmer and more sunny days in order to grow in satisfactory conditions. If the weather keeps on to be favourable, the potato crop will be a good one throughout the country.

The production of potatoes in 1940 is estimated at 76,088,000 centals (126,811,000 bushels) against 50,553,000 (84,253,000) in 1939 and an average of 47,014,000 (78,356,000) in 1934 to 1938.

Portugal: Potatoes production obtained in 1939 is estimated at 13,361,000 centals (22,268,000 bushels) against 13,068,000 centals (21,779,000 bushels) in the year 1938 and an average of 12,353,000 centals (20,587,000 bushels) during the previous five years; reports 102.2 and 108.2. The area cultivated in 1939, estimated at about 74,000 acres, is 4 per cent. inferior to that 1938 and 8 per cent. inferior to the previous five years average.

Romania: The first official estimate of the area cultivated with potatoes in the proper soil, relating to the present territory of Romania (excluding Bessarabia and Northern Bucovina) is at 384,000 acres against the figures approximately calculated of 357,000 acres for 1939.

The corresponding figures of the production of potatoes are 30,844,000 centals (51,405,000 bushels) this year against 29,344,000 centals (48,905,000 bushels) in 1939.

Sweden: On 15 July 1940 potato crop condition was quoted 100 against 105 at the corresponding period of last year.

Switzerland: Potatoes suffered at times from excessive moisture. Early varieties were affected by phytophthora, as to result in a certain deficit of yield. Late potatoes, especially the vigorous varieties, such as the Ackersegen and the Voran and, in part, the Erdgold and the Industrie, promise good yields, particularly where they were sufficiently treated.

On the whole, in spite of damages caused by the disease, a crop from good to very good may be expected.

Crop condition of potatoes at the beginning of August, according to the system of the country, is quoted 80, against 85 on 1 July 1940 and 62 on 1 August 1939.

Argentina: Crop of potatoes of the late variety has given results variable from average to good in the provinces of Santa Fé, Mendoza, San Juan and Cordoba. The product's quality is fairly poor.

United States: The production of potatoes in 1940 is estimated at 224,588,000 centals (374,314,000 bushels) against 218,410,000 (364,016,000) in 1939 and an average of 227,263,000 (378,772,000) in 1934 to 1938; percentages, 102.8 and 98.8.

Turkey: The production of potatoes in 1940 is estimated at 7,937,000 centals (13,228,000 bushels) against 3,727,000 (6,212,000) on average from 1934 to 1938; percentage 212.9.

THE SUGAR SEASON IN EUROPE

Until now it is possible to confirm our forecast of last month about the probable production of sugar-beet in Europe during the current year, that is if weather conditions keep normal until harvest-time, one may hope for a production of sugar-beet perhaps superior to last year's, setting aside ravages caused by war. In truth, the condition of the sugar-beet crop did not deteriorate during the month of July and until mid-August. In most European regions the weather was variable, rather rainy and the temperature was often below normal. In the most northern countries of Europe sugar-beet crops suffered more from weather conditions, they have an irregular appearance and insects multiplied, causing some damage to the crops. In the countries of central and southern Europe variable and wet weather was not unfavourable to sugar-beet which developed normally and foliage has a fresh colour, although the crop was rather late on account of rains and cool weather. In many a region roots are too small for this period of the year, but the amount of sugar contained is

high. On the other hand there were places where crops suffered from ravages due to drought, but in general throughout Europe vegetation of sugar-beet rather profited by the weather conditions of the season and prospects of the sugar-beet crop are satisfactory.

In our official report of July we mentioned the inevitable ravages to crops brought about by war, and we concluded that for this reason crop returns in the countries where war operations took place will be deficient independently from meteorological conditions.

To the purpose M. F. O Licht wrote to the Institute that according to the most recent information areas cultivated with sugar-beet were only very seldom ravaged or abandoned, that in the Netherlands and Belgium almost no damage was verified on sugar-beet fields and that damages caused to factories are only negligible, let aside one factory in Belgium. If also in France ravages were not too heavy, all the more a good result of sugar-beet crop in general may be hoped for.

* * *

In the official report of July we published that after the war between the U. S. S. R. and Finland a factory of sugar was transferred to the U. S. S. R. and that two others were kept by Finland. To rectify this statement we inform that before the war Finland had only two factories, one of which remained in the hands of the Finns and the other one was taken over by the U. S. S. R.

CURRENT INFORMATION ON SUGAR.

Denmark: Results of the weekly analyses of sugarbeets.

| COUNTRIES | Average weight of root | | | Average weight of leaves | | | Sugar content | | | Weight of sugar per root | | |
|---------------------|------------------------|------|-----------|--------------------------|------|-----------|---------------|------|-----------|--------------------------|------|-----------|
| | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 |
| | oz. | oz. | oz. | oz. | oz. | oz. | % | % | % | oz. | oz. | oz. |
| 1st. week of August | 8.5 | 10.6 | 7.2 | 16.9 | 18.6 | 12.7 | 13.3 | 12.6 | 12.6 | 1.1 | 1.3 | 0.9 |
| 2nd. week of August | 10.8 | 13.1 | 8.4 | 18.0 | 19.8 | 13.1 | 13.7 | 12.1 | 13.7 | 1.5 | 1.6 | 1.2 |

The crop condition expressed in the system of the Institute was 97 on August 1, 1940, against 94 on July 1, 1940 and 103 on August 1, 1939.

Hungary: During the month of July the condition of sugar-beet has generally improved and the vegetation is flowering everywhere in the country; their condition is excellent in some places. Roots are sound, big enough; foliage is abundant. In too wet soil rotting of roots appears only sporadically in one or two Counties. General appearance of roots is promising. A good sugar-beet crop is expected.

The production of sugar-beet in 1940 is estimated at 37,999,000 centals (1,899,000 short tons) against 25,585,000 (1,279,000) in 1939 and an average of 21,154,000 (1,058,000) in 1934 to 1938.

Italy: By a ministerial decree of 24 July 1940 it was established for the next season a production of sugar amounting to 9,900,000 centals (5,000,000 short tons), which

Acreage of Sugar-beet.

| COUNTRIES | 1940 * | 1939 | Average 1934 to 1938 | % 1940 | |
|---------------------------|---------------|-------------|-------------------------|------------|------------------|
| | | | | 1939 = 100 | Average = 100 |
| | | | | acres | |
| Germany | (1) 2,000,000 | 1,402,331 | 1,110,570 | — | — |
| Belgium | 133,500 | 134,168 | 117,364 | 99 | 114 |
| Bohemia-Moravia | (1) 351,000 | (1) 280,890 | 362,766 | 125 | 110 |
| Slovakia | 47,000 | 36,300 | | 137 | 223 |
| Bulgaria | 40,000 | 28,786 | 17,713 | 115 | 108 |
| Denmark | 109,000 | 94,600 | 100,282 | 110 | 64 |
| Spain | 136,000 | (1) 120,000 | 212,299 | 56 | 94 |
| Finland | 8,150 | 14,460 | 8,664 | 107 | 114 |
| France | 670,000 | 621,015 | 585,856 | — | — |
| Hungary | (2) 180,000 | 129,700 | 114,600 | 156 | 117 |
| Ireland | 65,000 | 41,660 | 55,429 | 111 | 159 |
| Italy | 408,000 | 368,313 | 256,870 | 184 | 181 |
| Latvia | 62,000 | 33,660 | 34,101 | 141 | 176 |
| Lithuania | 30,900 | 21,890 | 17,569 | 106 | 115 |
| Netherlands | 119,800 | 112,934 | 104,411 | — | — |
| Poland | — | 406,500 | 320,886 | — | — |
| Romania | (3) 110,370 | 131,872 | 89,120 | 100 | 97 |
| United Kingdom | 350,000 | 344,400 | 354,970 | 108 | 106 |
| Sweden | 136,000 | 125,413 | 127,817 | 94 | 169 |
| Switzerland | 8,400 | 8,900 | 4,964 | 130 | 253 |
| Yugoslavia | 150,000 | 114,000 | 58,691 | — | — |
| Total Europe (a) . . . | 5,115,120 | 4,571,792 | 4,054,942 | 111 | 125 |
| U. S. S. R. | 2,940,000 | 2,928,000 | 2,958,142 | 100 | 99 |
| Total Europe (b) . . . | 8,055,120 | 7,499,792 | 7,013,084 | 107 | 114 |
| Canada | — | 58,600 | 47,514 | — | — |
| United States | 913,000 | 937,000 | 798,800 | 97 | 114 |
| Total North America . . . | — | 995,600 | 846,314 | — | — |
| Japan | 46,500 | 48,446 | 42,481 | 96 | 109 |
| Manchukuo | — | 54,000 | 38,885 | — | — |
| Turkey | 91,000 | 86,678 | 63,213 | 105 | 145 |
| Total Asia . . . | — | 189,124 | 144,579 | — | — |
| TOTALS . . . { a) | — | 5,756,516 | 5,045,835 | — | — |
| b) | — | 8,684,516 | 8,003,977 | — | — |

* Approximate data. — (a) Not including U. S. S. R. — (b) Including U. S. S. R. — (1) Licht's estimate. — (2) Including the reincorporated zone and the Subcarpathia. — (3) Not including Bessarabia and northern Bucovina. — (4) Average of two years.

represents a slight decrease in comparison with the production of the season 1939-40, but a considerable increase with respect to the average production of the five preceding seasons.

Romania: The first official estimate of the area sown with sugar-beet, relating to the present territory of Romania (excluding Bessarabia and Northern Bucovina) is at 110,000 acres against the figures approximately calculated of 93,000 acres in 1939.

The production of sugar beet in 1940 is estimated at 15,755,000 centals (787,700 short tons) against 18,849,000 (942,400) in 1939 and an average of 12,921,000 (646,000) in 1934 to 1938. The production of this year refers to the actual territory of the country, not including Bessarabia and Northern Bucovina.

Yugoslavia: Frequent rains in spring and the beginning of summer were generally favourable to the vegetation of sugar-beet.

Rains fallen also during the month of July hindered crop ripening and accumulation of sugar.

However, crop conditions at the beginning of August were very good and an abundant production is expected.

Slovakia: The production of sugar-beet is estimated at 11,500,000 centals (575,000 short tons) which correspond around 1,630,000 centals (81,600 short tons) of sugar.

Production of Cane-Sugar.

| COUNTRIES | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | % 1939-40 | |
|--------------------------------|----------------|----------------|--|-------------------|-------------------|--|------------------|------------------|
| | ooo centals | | | short tons | | | 1938-39 = 100 | Average = 100 |
| AMERICA. | | | | | | | | |
| Antigua | 304 | 493 | 514 | 15,200 | 24,640 | 25,688 | 62 | 59 |
| Argentina | 11,442 | 10,244 | 8,147 | 572,000 | 512,190 | 407,341 | 112 | 140 |
| Barbados | 2,228 | 3,502 | 2,517 | 111,391 | 175,114 | 125,850 | 64 | 88 |
| Brazil | 26,235 | 24,251 | 23,161 | 1,310,000 | 1,200,000 | 1,158,050 | 108 | 113 |
| Cuba | 62,567 | 61,730 | 57,752 | 3,128,000 | 3,100,000 | 2,887,585 | 101 | 108 |
| Ecuador | 507 | 483 | 413 | 25,000 | 24,100 | 20,657 | 105 | 123 |
| United States (La. & Fl.) | 10,582 | 11,660 | 7,196 | 530,000 | 583,000 | 359,800 | 91 | 147 |
| British Guiana | 4,299 | 4,239 | 3,978 | 215,000 | 211,954 | 198,899 | 101 | 108 |
| Surinam | 245 | 270 | 378 | 12,240 | 13,499 | 18,895 | 91 | 65 |
| Jamaica | 2,227 | 2,642 | 2,086 | 111,000 | 132,100 | 104,287 | 84 | 107 |
| Martinique | 1,323 | 1,433 | 1,104 | 70,000 | 72,000 | 55,206 | 92 | 120 |
| Mexico | 6,834 | 7,772 | 6,037 | 340,000 | 388,602 | 301,854 | 88 | 113 |
| Peru | 8,686 | 8,157 | 8,702 | 434,000 | 410,000 | 435,102 | 106 | 100 |
| Puerto Rico | 22,046 | 17,042 | 18,515 | 1,000,000 | 852,000 | 925,750 | 129 | 119 |
| Dominican Republic | 9,921 | 9,502 | 9,030 | 500,000 | 475,000 | 451,494 | 104 | 110 |
| St. Kitts | 626 | 836 | 659 | 31,300 | 41,816 | 32,944 | 75 | 95 |
| St. Lucia | 220 | 180 | 168 | 11,000 | 9,016 | 8,424 | 122 | 130 |
| Trinidad | 2,866 | 2,877 | 2,983 | 140,000 | 143,870 | 149,129 | 100 | 96 |
| Venezuela | 551 | 540 | 489 | 28,000 | 27,000 | 24,472 | 102 | 113 |
| <i>Total America</i> | <i>173,709</i> | <i>167,853</i> | <i>153,829</i> | <i>8,584,131</i> | <i>8,395,901</i> | <i>7,691,410</i> | <i>103</i> | <i>113</i> |
| ASIA. | | | | | | | | |
| Taiwan | 26,630 | 33,671 | 19,895 | 1,331,500 | 1,683,500 | 994,719 | 79 | 134 |
| India | 64,155 | 55,213 | 59,190 | 3,210,000 | 2,760,600 | 2,959,455 | 116 | 108 |
| Japan | 3,386 | 3,596 | 2,359 | 169,300 | 179,800 | 117,951 | 94 | 144 |
| Java | 34,172 | 34,392 | 19,839 | 1,710,000 | 1,720,000 | 991,927 | 99 | 172 |
| Philippines | 24,912 | 22,708 | 23,455 | 1,230,000 | 1,140,000 | 1,172,739 | 110 | 106 |
| <i>Total Asia</i> | <i>153,255</i> | <i>149,580</i> | <i>124,738</i> | <i>7,670,800</i> | <i>7,483,900</i> | <i>6,236,791</i> | <i>102</i> | <i>123</i> |
| AFRICA. | | | | | | | | |
| Egypt | 3,524 | 3,573 | 3,179 | 176,200 | 178,634 | 158,951 | 99 | 111 |
| Mauritius | 5,059 | 7,084 | 5,886 | 252,930 | 354,180 | 294,310 | 71 | 86 |
| Reunion | 1,622 | 1,890 | 1,745 | 81,100 | 94,505 | 87,267 | 86 | 93 |
| Union of South Africa | 11,623 | 11,616 | 9,426 | 581,100 | 580,800 | 471,290 | 100 | 123 |
| <i>Total Africa</i> | <i>21,828</i> | <i>24,163</i> | <i>20,236</i> | <i>1,091,330</i> | <i>1,208,119</i> | <i>1,011,808</i> | <i>90</i> | <i>108</i> |
| OCEANIA. | | | | | | | | |
| Australia | 20,724 | 18,437 | 15,933 | 1,040,000 | 921,900 | 796,647 | 112 | 130 |
| Hawaii | 19,268 | 19,401 | 18,961 | 963,000 | 970,000 | 948,051 | 99 | 102 |
| Fiji Islands | 2,657 | 2,654 | 2,912 | 132,800 | 132,700 | 145,602 | 100 | 91 |
| <i>Total Oceania</i> | <i>42,649</i> | <i>40,492</i> | <i>37,806</i> | <i>2,135,800</i> | <i>2,024,600</i> | <i>1,890,300</i> | <i>105</i> | <i>113</i> |
| TOTALS | 391,441 | 382,088 | 336,609 | 19,482,061 | 19,112,520 | 16,830,309 | 102 | 116 |

(1) Approximate data.

Sweden: On 15 July 1940 the condition of sugar-beet crop was quoted 93 against 103 at the corresponding period of last year.

U. S. S. R.: The warm and wet weather of summer was in general very favourable to the vegetation of sugar-beet. The crop condition of sugar-beet towards the end of July was very good and the production of this year is consequently expected to be sufficiently abundant.

Argentina: Production of cane-sugar of the present season varies from average to good in the province of Tucuman and from good to excellent in the other producing centres of the country. Industrial yields of the cane are high.

United States: The production of sugar-beet in 1940 is estimated at 211,060,000 centals (10,553,000 short tons) against 215,460,000 (10,773,000) in 1939 and an average of 179,416,000 (8,970,000) in 1934 to 1938; percentages, 98.0 and 117.6.

CURRENT INFORMATION ON VINES.

Bulgaria: Frequent rains during June injured the condition of vines, which were attacked by cryptogamic diseases. The slight improvement brought by warmer and more dry weather in July was jeopardized again by the return of rains towards the end of July and the beginning of August, when crop condition of vines was considered unsatisfactory

Greece: Condition of vines during July in general showed no great variations, keeping sufficiently satisfactory. However, cooler and more rainy weather during the last ten days of July and at the beginning of August intensified the spreading of attacks of cryptogamic diseases, which were already noticed in some places with a deterioration of the vine crop condition.

Hungary: Variable, abnormally wet weather, and temperature first warm and then cold during the last weeks were unfavourable to vines, the conditions of which deteriorated. Such conditions helped the peronospora of grapes, and the disease became of great importance; the heavy ravages vary 70-80 per cent. in each place. In several places presence of mildew is complained. The serious damages let foresee little satisfactory results of vintage. Unfavourable weather conditions make it difficult to fight peronospora and mildew energetically.

First of all in several vine-growing regions wine-growers find themselves short of material means and, considering the previsions, talk about probably deficient crops and stop works of treatment; somewhere they have even stopped season works in the vineyards which, naturally, are invaded by weed.

Italy: Production of wine in 1940, according to the "Comitato Corporativo Vitivinicolo", is expected to amount to about 747,917,000 Imperial gallons (898,181,000 American gallons), that is a production about 87,990,000 Imperial gallons (105,668,000 American gallons) inferior to the five-years average ending 1938. Production of grapes during the present season is estimated at scarcely 114,600,000 centals. Scarce production of grapes and wine of this year is due to unfavourable weather conditions, especially to the frost which caused serious damages in several regions of the country.

However, the "Comitato Corporativo Vitivinicolo" fixed that 5 per cent. of the next production of wine must be destined to distillation for the fabrication of alcohol.

Portugal: Vines have much suffered from attacks of mildew and oidium. Prospects of grape crop during the current year are absolutely deficient.

Romania: A very poor production of wine was expected towards the middle of August.

Switzerland: Prospects of wine crop are various. Vines are very promising in saint-gallois Rheintal and grisonne Herrschaft. In the other regions of Eastern Switzerland it is possible to rely on a yield from poor to average. In Western Switzerland also crop is expected to be inferior to the average. Crop condition on August 1 was quoted 59, according to the system of the country, against 65 on 1 July 1940 and 67 on 1 August 1939.

Yugoslavia: Atmospheric precipitations, too frequent and abundant in spring and at the beginning of summer, had an unfavourable influence on the vegetation of vines, which in almost all wine-growing regions were affected by mildew and other cryptogamic diseases.

Grapes and wine production is expected to be very poor and much inferior to last year's.

Argentina: The vintage results have confirmed prospects of an average production of wine in the region of Cuyo and a good one in Rio Negro. Dry grapes elaboration has been particularly important this year in the province of Catamarca.

CURRENT INFORMATION ON OLIVES.

Greece: During May and June olive growers took preventive measures to fight a spread of "dacus".

Atmospherical conditions of July were not, in general, very favourable to the growth of olives.

Portugal: Olive conditions in June were very variable from a region to another and on the whole it is possible to foresee a production of olives inferior to last year's.

Argentina: Olive crop in the provinces of Cuyo, Catamarca and La Rioja gave results variable from average to good.

CURRENT INFORMATION ON FLAX.

Bohemia and Moravia (Protectorate): Weather conditions of last spring were favourable to flax sowing operations. Towards the end of July early flax (sown in April) had a fine appearance and was almost ripe to be harvested. Late flax (sown in winter) found itself, at the same period, at the flowering phase. In general the stem of flax is well grown up and sufficiently high and in some places it suffered from showers. On the whole a good fibre crop and a less satisfactory production of seed, are expected, owing to the ravages caused by the showers.

Hungary: The growing of cultivated flax, especially for seed, is still going on. Return is below average.

Romania: The area sown with flax increased notably this year, in accordance with the economic programme of the Government. The first official estimate of the

area sown with flax (excluding Bessarabia and Northern Bucovina) is 34,000 acres against the figures approximately calculated of 26,000 acres in 1939. The corresponding figures for the production of flax fibre are 122,000 centals this year against 118,000 centals in 1939.

This year the quality of the fibre is exceptionally good, owing to weather conditions (abundant rainfall and cool weather) very favourable to such a production.

Area and Crop Condition of Flax.

| COUNTRIES | AREA SOWN | | | | | | CROP CONDITION †) | | | | | | | | | |
|-------------------------|-----------|-------|--------|--------|----------------------------|---------------|-------------------|-------------|-----|-----|------------|-----|-----|-------------|---|----|
| | 1940 | | 1939 | | Average 1934 to 1938 | % 1940 | | 1-VIII-1940 | | | 1-VII-1940 | | | 1-VIII-1939 | | |
| | 000 acres | | | | | 1939 = 100 | Aver. = 100 | | | | | | | | | |
| | (a) | (b) | (c) | (d) | | | | (e) | (f) | (g) | (h) | (i) | (j) | (k) | | |
| Hungary | { (l) | (1) | 12 (2) | 10 (3) | 8 | — | — | — | — | — | — | — | — | — | — | — |
| Lithuania (4) | { (m) | (1) | 20 (2) | 20 (3) | 21 | — | — | — | — | — | — | — | — | — | — | — |
| Romania | | | 235 | 211 | 193 | 111.1 | 121.6 | ... | ... | ... | — | — | 93 | 110 | — | — |
| U. S. S. R. (6) | (5) | 34 | 30 | 60 | — | — | — | — | — | — | — | — | — | — | — | — |
| Canada | | 4,440 | 4,415 | 5,126 | 100.6 | 86.6 | — | — | — | — | — | — | — | — | — | — |
| United States | | 350 | 307 | 292 | 114.0 | 119.7 | ... | ... | ... | — | — | — | 92 | — | — | 85 |
| India | | 3,168 | 2,034 | 1,217 | 155.8 | 263.2 | — | — | — | — | — | — | — | — | — | — |
| Egypt | | 3,713 | 3,869 | 3,542 | 96.0 | 104.8 | — | — | — | — | — | — | — | — | — | — |
| | | 10 | 10 | 6 | 102.6 | 162.4 | — | — | — | — | — | — | — | — | — | — |

† For the explanation of signs and figures indicating crop condition, see cereal tables and notes on page 485. (a) Above the average. — (b) Average. — (c) Below the average. — (l) Grown principally for fibre. — (m) Grown principally for seed.

(1) Including the territory in the north reunited with Hungary and Sub-Carpathia. — (2) Including the territory in the north reunited with Hungary but excluding Sub-Carpathia. — (3) Territory as at the end of 1937. — (4) Flax and hemp. — (5) Not including Bessarabia and Northern Bucovina. — (6) "Dolgouetzi" variety grown for linseed and fibre.

Yugoslavia: The hope of a good flax crop this year was not realised at all. Frequent rains in spring and at the beginning of summer were first very favourable to vegetation, but persistence of damp and cool weather in July caused stem diseases.

At any rate, the remarkable extension of area sown with flax this year and the more frequent sunny days in July and at the beginning of August as well as measures taken to fight the diseases, allow to foresee that flax production will not be much inferior to last year's, in spite of all damages suffered.

U. S. S. R.: The wet and warm weather in summer was favourable to the vegetation of flax. At the beginning of August operations of flax crop started in many regions of the Union, whilst in the Ukraine they were in full swing.

Argentina: The labour and sowings of flax were hindered by the rainy weather of the last two months.

CURRENT INFORMATION ON COTTON.

Bulgaria: Growth and ripening of cotton during the month of July advanced in good condition.

Greece: Weather conditions in spring were not very favourable to the sowing of cotton, which in several places had to be resown. A reduction of area in com-

parison with last year's is expected. A production also inferior to that of last year is expected, owing to the fact that weather conditions in July were not, in general, very favourable to the vegetation of cotton.

Romania: During the first week of August cotton started flowering. This year the area sown with cotton has strongly increased in comparison with that of the preceding years, reaching 66,400 acres, against 17,400 acres in 1939 and 4,800 acres for the average 1934-1938. Cotton crop being unnoticeable in Bessarabia, the preceding figures may be compared with each other.

Production is estimated as follows: Cotton (ginned) 118,500 centals (24,800 bales of 478 lb. net weight) this year, against 20,200 centals (6,100 bales) in 1939 and an average of 7,900 centals (1,700 bales).

U. S. S. R.: Very warm and dry weather during the months of June and July in the cotton districts of Asia was very favourable to the growth and ripening of cotton, which at the beginning of August was in good condition.

Towards mid-August in some places of Turkmenia cotton crop started, in the region of Azerbeidjan at the same period cotton found itself in the phase of forming and ripening of the bolls and in some places the opening of the bolls started already.

Argentina: Rainy weather predominating during the cotton harvest has slightly affected the quality of the lint.

United States: During the week ended July 24, cotton crop progress became more favourable with warmer weather. During the following week progress was fairly satisfactory, and it continued so up to August 14, except in the South-eastern States of the cotton belt and the Mississippi Valley. During the week ended August 21 excessive rains was detrimental in the Eastern cotton belt, causing considerable damage and destruction in Virginia and the Carolinas.

Summary of the Cotton Reports issued by the Government of the United States, during the cotton season (August 1-July 31).

| | Provisional estimates for dates indicated 1940-41 | Final estimates | | Percent. 1940-41 | |
|---|---|-----------------|----------------------------|------------------|-------------|
| | | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 = 100 | Aver. = 100 |
| Report referring to July 1: | | | | | |
| Area in cultivation (acres) | 25,077,000 | 24,083,000 | 29,132,000 | 101.6 | 86.1 |
| Report referring to August 1: | | | | | |
| Area left for harvest (acres) (1) | 24,616,000 | (2) 23,805,000 | (2) 28,400,000 | 103.4 | 86.7 |
| Crop condition (per cent. of normal) . . | 72 | 74 | (3) 71 | — | — |
| Production (4) | 11,429,000 | 11,816,000 | 12,254,000 | 96.7 | 89.9 |
| Yield of lint per acre, in lb. | 222.3 | 237.9 | (3) 198.1 | 93.4 | 112.3 |
| Cotton ginned to August 1 (5) | 31,966 | 137,713 | 107,222 | 23.3 | 29.8 |
| Cotton ginned to August 16 (5) | 169,420 | 309,677 | 341,902 | 54.7 | 49.6 |

(1) Area in cultivation on July 1 less the ten-year (1930-39) average abandonment, from natural causes, 1.9 per cent. — (2) Area actually harvested. — (3) Ten-year (1929-38) average. — (4) In bales of 478 lb. net weight and exclusive of linters. — (5) In running bales, counting round bales as half bales and exclusive of linters.

CURRENT INFORMATION ON HEMP.

Hungary: Stems of hemp especially cultivated for seed were sufficiently high at the end of July. Hemp was fairly thick and still in flower. In several regions, on the other hand, stems had not a sufficient growth and fields were invaded by weed; all that will change, eventually, the forecast on this crop, which needs dry and sunny weather.

Hemp for fibre is growing vigorously. Fields are well furnished, stems sufficiently high. Sunny days are lacking. Crop of hemp for fibre was carried on normally, except in some regions where it is still going on. This crop will give returns below average.

The production of hemp seed in 1940 is estimated at 34,000 centals against 26,000 centals in 1939 and an average of 19,000 centals in 1934 to 1938.

The production of fibre hemp in 1940 is estimated at 246,000 centals viz a data which coincides exactly with the year 1939 and an average of 186,000 centals in 1934 to 1938.

Romania: The first official estimate of the area sown with hemp in the present territory of Romania (excluding Bessarabia and Northern Bucovina) is at 103,000 acres against the figures approximately calculated of 113,000 acres in 1939. The corresponding figures of the production of hemp fibre are 412,000 centals this year against 691,000 centals in 1939.

Yugoslavia: Very rainy spring and the very damp beginning of summer were favourable to the growth of hemp in the principal producing zones where in many places the stem reached an exceptional height.

Prevision of a good unit-yield as well as an increase of area sown allow to hope for an abundant production of first quality.

CURRENT INFORMATION ON TOBACCO.

Bulgaria: Rainy and cool weather in June was favourable to the growth of tobacco, whereas warmer and more dry July was very favourable to the ripening and crop of the leaves. But return of wet and cold weather at the end of July and at the beginning of August hindered the advancing crop and the drying operations of leaves. According to an unofficial source, production of tobacco this year is expected to be sufficiently abundant and perhaps it could reach the estimate of 1936 record-crop.

Greece: The Ministry of Agriculture decided this year to compel tobacco growers to harvest tobacco grains available for the extraction of oil. The area sown with tobacco, according to unofficial information, was reduced this year about 20 per cent in comparison to last year's. Atmospherical conditions of June and July were not very favourable to the growth of the crop and a production inferior to last year's is also expected, but the quality will be good.

Tobacco crop was at its best towards mid-August and it is expected that the sale of the new tobacco crop could be started at the beginning of September.

Hungary: Tobacco plantations are fine. Foliage is abundant, sound and with a fresh colour. Flowering has begun. Lower leaves are being harvested.

Yugoslavia: Rainy weather of spring and the beginning of summer was very favourable to the growth of tobacco in Herzegovina, where production is expected to be very abundant.

The quality of the product, which was slightly injured by excessive moisture, has later improved thanks to sunny weather in July.

U. S. S. R.: In some Kolkhoz of Georgia tobacco crop started towards mid-August.

Argentina: Tobacco crop and drying were carried on in generally satisfactory conditions. The results obtained were good in all centres of production, except in the province of Córdoba.

United States: The production of tobacco in 1940 is estimated at 1,262,087,000 lbs against 1,848,654,000 lbs in 1939 and an average of 1,294,694,000 in 1934 to 1938; percentages, 68.3 and 97.5.

CURRENT INFORMATION ON HOPS.

Bohemia and Moravia (Protectorate): Towards the end of July hops condition was fairly good, especially that of the early crop, which was just forming the cones. The late crop, which at the same period was in the flowering phase, showed an appearance less satisfactory, because of mildew attacks.

The rather rainy and cold weather at the beginning of August was not, in general, very favourable to the crop. At any rate growers are taking measures energetically to fight spread of mildew.

Hungary: Hops cones were ripening at the end of July. Crop has begun.

Yugoslavia: Crop condition of hops shows various aspects. In Slovenia in the valley of Savinja crop condition is very good, whereas in the other parts of Slovenia hops suffered much from stormy weather. In the regions of Vojevodine and Srem, condition is still uncertain and crop will depend on weather conditions of August. By a recent decision, promulgated by the governor of Croatia, the regulation of hops production and trade was extended also to the territory of Croatia.

United States: The production of hops in 1940 is estimated at 39,460,000 lbs. against 39,380,000 lbs. in 1939 and an average of 40,029,000 lbs. in 1934 to 1938; percentages, 100.2 and 98.6.

CURRENT INFORMATION ON OTHER PRODUCTS:

Cacao.

Brazil: The production of cacao of the State of Bahia, which furnishes more than 90 per cent. of the total crop of the country, was of 2,513,000 centals during the season ending on 30 April 1940, against 2,976,000 centals in the preceding season.

On 1 May 1940, at the beginning of the new season, the cacao stock existing in the State of Bahia was scarcely of 12,000 centals, the production of the season having been regularly exported.

Coffee.

Brazil: The exportable production of coffee of the season 1940-41, as estimated by the "Departamento Nacional do Café" for the period ending 31st March 1941, reaches 27,580,000 centals. For disposal of the commercial season of 1940-41 the stocks carried over from the 1939-40 season amounting to 344,000 centals have been added to this quantity.

Consequently, the total amount of the exportable supplies in 1940-41 reaches 27,924,000 centals against 29,843,000 centals of the previous season. In the following table we are publishing the partial amounts of the season 1940-41 according to producing countries, compared with the corresponding amounts of the three previous seasons.

| | 1-VI-1940 to 31-III-1941 | 1-VI-1939 to 31-III-1940 | 1-VI-1938 to 31-III-1939 | 1-VII-1937 to 31-III-1938 |
|---|-----------------------------|-----------------------------|-----------------------------|------------------------------|
| | (thousand centals) | | | |
| São Paulo | 18,519 | 20,909 | 19,524 | 23,188 |
| Minas Geraes | 4,630 | 4,112 | 5,216 | 5,763 |
| Espirito Santo | 1,084 | 1,254 | 1,448 | 1,753 |
| Rio de Janeiro | 992 | 708 | 1,238 | 1,290 |
| Paraná | 926 | 1,140 | 714 | 959 |
| Bahia | 331 | 397 | 397 | 331 |
| Pernambuco | 106 | 265 | 265 | 265 |
| Goiás | 92 | 132 | 132 | 132 |
| <i>Total</i> . . . | 27,580 | 28,917 | 28,934 | 33,681 |
| Stocks remaining for disposal from preceding seasons | 344 | 926 | 2,381 | — |
| Total exportable production . . . | 27,924 | 29,843 | 31,315 | 33,681 |

The government of Brazil adopted a series of measures with the object of establishing a statistic balance between the production of coffee and its possibilities of absorption by the World Market. Outstanding among these measures is that which for the commercial season 1940-41 fixes a *quota of sacrifice* corresponding to 25 per cent. of the exportable crop coming from the states of São Paulo, Minas Geraes, Rio de Janeiro, Espirito Santo and Paraná. This quantity of coffee is to be bought by the "Departamento Nacional do Café", at the price of 2 milreis a sack of 60 kilogrammes. The states of Rio de Janeiro, Espirito Santo and Paraná are always entitled

to transform their *quota of sacrifice in free quota available for trade*, by paying 50 mil-reis a sack to the "Departamento Nacional do Café" which will utilize the profit by buying equal quantities of coffee in the state of São Paulo.

For the exportable crop of the latter state a supplementary *equilibrium quota* of 30 per cent. has been fixed. The "Departamento Nacional do Café" may buy this at the price of 65 mil-reis a sack of 60 kilogrammes. The Government of Brazil has authorized the Bank of Brazil to lay out money for the crop 1940-41.

The quantity of available coffee on June 30, 1940 in all ports of Brazil was that of 3,389,000 centals of which 2,443,000 centals were lying in the port of Santos, 511,000 centals in the port of Rio de Janeiro, 247,000 centals in the port of Paranaguá and the remaining 188,000 centals in the other ports. The stocks of coffee eliminated by Brazil since 1931 until 30 June 1940 amount to 91,283,000 centals of which 3,164,000 centals have been destroyed during the commercial season from 1 July 1939 to 30 June 1940.

Costa Rica: The flowering of coffee-plantations has been average in the principal producing centres of the country.

Guatemala: The report of June shows that the conditions of coffee-plantations were generally good in the whole country.

Dominican Republic: The last official report shows that the actual condition of coffee-trees promises a good coffee crop for the season 1940-41.

Angola: Weather conditions of last months were generally favourable to the different vegetative phases of coffee plantations. The coffee crop of the present season is expected to be good.

Colza and Sesame.

Romania: The first official estimate of the area sown with colza relating to the present territory of Romania (excluding Bessarabia and Northern Bucovina) is at 76,000 acres against the figures approximately calculated of 107,000 acres in 1939. The corresponding figures for the production are 682,000 centals (1,363,000 bushels) against 612,000 centals (1,225,000 bushels) in 1939.

Yugoslavia: Protracted winter and sometimes very hard, frosts followed by frequent spring rains injured colza crop greatly; it is expected to be very poor this year. Weather conditions in July brought a remarkable improvement of the crop condition.

Turkey: The production of sesame in 1940 is estimated at 926,000 centals (46,300 short tons) against 599,000 (29,900) an average of 1934 to 1938; percentage 154.7.

CURRENT INFORMATION ON FODDER CROPS.

Denmark: Rains had somehow improved the previsions; except some regions of Jutland a production of straw less abundant than last year's is expected.

Pasture condition has a little improved.

The crop condition of the principal fodder crops, expressed in the system of the Institute, was the following:

| | August 1, 1940 | July 1, 1940 | August 1, 1939 |
|--|-------------------|-----------------|-------------------|
| Field-hay (Artificial meadows) | 68 | 69 | — |
| Meadow-hay (Permanent meadows) | 72 | 76 | — |
| Turnips | 92 | 92 | 100 |
| Pasture | 72 | 58 | 91 |
| Mangels | 95 | 90 | 98 |

Greece: The rather rainy and cool weather in June and July was favourable to the growth of fodder crops.

Hungary: For the second time clover has been cut and, in several places, for the third time. Crop of the first and second cutting is good as to quantity, but only below average or poor as to quality.

Housing of the second cutting of alfalfa came to an end. Result is satisfactory. The work of the third cutting is advancing. A good crop is expected.

A very satisfactory production of *trémois* is already housed in places where the weather was not wet.

Fodder maize and mohar show a fine vegetation. The cutting of early grains is advancing.

Rainy weather was greatly favourable to the growth of meadows second crop.

Pastures are vigorous. Growth of grass is very satisfactory. In some places there is a complaint about invasion of weed. Pastures which are situated in plains are still covered with water.

The aspect of mangels was fine at the end of July. Roots were well grown. Green foliage is so abundant that it covers the field entirely. Crop is expected to be very good.

Romania: Towards mid-August the condition of beet for fodder was very good. In the mountainous regions hay-harvest advanced. Pastures had generally a good appearance.

Sweden: On 15 July 1940 the condition of the principal fodder cultures, as compared with that of the corresponding period of last year, was the following.

| | 15 July 1940 | 15 July 1939 |
|--------------------------------------|-----------------|-----------------|
| Artificial meadows | 82 | 95 |
| Permanent meadows | 77 | 93 |
| Fodder roots and tubercles | 93 | 100 |

Switzerland: Persisting rains during July caused a considerable delay in hay-making in mountainous regions. Permanent meadows deserved an estimate less favourable than the preceding month's. On the other hand artificial meadows resisted bad weather well. On the Alps growth of pasture suffered remarkably from the return

of cold weather, so that pastures show an aspect rather more disadvantageous than last month's.

Crop condition of permanent meadows, according to the system of the country, was quoted 73 on August 1, against 76 on 1 July 1940 and 85 on 1 August 1939; as for artificial meadows (clover, lucerne and so on) quotes are respectively the following: 77, 76 and 86. Finally those of pastures were 67, 78 and 73.

Yugoslavia: Weather conditions of spring and the beginning of summer were particularly favourable to meadows and pastures as well as to the other fodder crops. An abundant production is expected.

U. S. S. R.: Warm and wet weather in July and early August was sufficiently favourable to the vegetation of meadows, pastures and in general all the other fodder crops; further cuttings of them is expected to be also very abundant.

Argentina: Pasture situation and the vegetative condition of artificial meadows in July were good throughout the country.

LIVESTOCK AND DERIVATIVES

PIG POPULATION IN DENMARK. *

(Thousand head)

| CLASSIFICATION | 1940 | | | | 1939 | | | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | June 29 | May 4 | March 23 | Febr. 10 | Dec. 30 | Nov. 18 | Oct. 7 | Aug. 26 | July 15 | June 17 | May 6 | March 25 |
| Boars for breeding. | 17 | 17 | 18 | 17 | 17 | 17 | 18 | 18 | 18 | 17 | 18 | 18 |
| Sows in farrow for first time . . . | 49 | 71 | 89 | 89 | 80 | 63 | 62 | 65 | 76 | 82 | 111 | 119 |
| Other sows in farrow | 146 | 151 | 165 | 169 | 162 | 176 | 189 | 192 | 171 | 163 | 160 | 152 |
| Sows in milk . . . | 90 | 101 | 88 | 80 | 95 | 86 | 81 | 85 | 99 | 101 | 81 | 78 |
| Sows not yet covered (and not for slaughter) | 34 | 26 | 24 | 25 | 21 | 24 | 25 | 27 | 27 | 23 | 20 | 19 |
| Sows for slaughter. | 15 | 17 | 16 | 12 | 12 | 15 | 15 | 9 | 10 | 9 | 9 | 9 |
| Total sows | 334 | 366 | 382 | 375 | 370 | 364 | 372 | 378 | 383 | 378 | 381 | 377 |
| Sucking pigs not weaned | 756 | 807 | 734 | 662 | 804 | 735 | 696 | 731 | 841 | 862 | 684 | 652 |
| Young and adult pigs for slaughter: | | | | | | | | | | | | |
| Weaned pigs under 35 kg. . . | 839 | 690 | 712 | 769 | 749 | 732 | 767 | 839 | 771 | 660 | 657 | 636 |
| Pigs of 35 and under 60 kg. . | 628 | 628 | 686 | 659 | 657 | 697 | 766 | 663 | 641 | 589 | 571 | 550 |
| Fat pigs of 60 kg. and over . | 625 | 626 | 534 | 558 | 537 | 685 | 573 | 535 | 473 | 491 | 443 | 491 |
| Total pigs . . . | 3,199 | 3,134 | 3,066 | 3,040 | 3,134 | 3,230 | 3,192 | 3,164 | 3,127 | 2,997 | 2,754 | 2,724 |

* Rural districts.

LIVESTOCK IN HUNGARY.

In the following table are given the principal results of the 1940 livestock enumeration. This enumeration is taken each year in the spring before March 31 (see § 23 of Law XII of 1894) on the occasion of the sanitary inspection of stock. The returns for 1940 relate to the present Hungarian territory including the northern regions reannexed and Sub-Carpathia; those of 1939 however relate only to the northern zone reannexed, without Sub-Carpathia. The returns for the years 1934 to 1938 relate to Hungarian territory as it was before the agreements of November 1938.

| CLASSIFICATION | 1940 1) | 1939 2) | 1938 | 1937 | 1936 | 1935 | 1934 |
|-----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <i>Horses</i> | 989,450 | 939,422 | 813,591 | 798,066 | 794,279 | 806,560 | 803,033 |
| including: | | | | | | | |
| adult geldings | 301,191 | 298,443 | 263,508 | 254,501 | 261,450 | 272,078 | 276,429 |
| mares under 3 years old | 112,997 | 101,039 | 75,031 | 75,827 | 67,289 | 57,968 | 52,672 |
| mares over 3 years old | 449,468 | 439,760 | 389,328 | 381,635 | 389,067 | 409,377 | 412,131 |
| <i>Asses</i> | 4,848 | 5,087 | 4,056 | 4,183 | 3,905 | 3,872 | 3,809 |
| <i>Mules</i> | 1,351 | 1,296 | 1,192 | 1,257 | 1,015 | 1,022 | 954 |
| <i>Cattle</i> (3) | 2,605,490 | 2,379,532 | 1,882,031 | 1,756,254 | 1,741,637 | 1,755,524 | 1,677,712 |
| including: | | | | | | | |
| oxen (3) | 326,736 | 266,146 | 190,992 | 188,696 | 178,368 | 171,129 | 171,305 |
| cows (3) | 1,248,532 | 1,102,926 | 917,294 | 900,272 | 901,203 | 913,727 | 903,228 |
| <i>Sheep</i> | 1,750,221 | 1,868,122 | 1,628,730 | 1,483,917 | 1,350,442 | 1,227,542 | 1,087,464 |
| including: | | | | | | | |
| wethers over 1 year old | 180,731 | 221,544 | 178,516 | 174,396 | 162,717 | 136,942 | 115,685 |
| ewes under 1 year old | 217,597 | 263,236 | 241,998 | 217,634 | 193,807 | 169,888 | 154,077 |
| ewes over 1 year old | 1,127,824 | 1,102,293 | 965,129 | 883,149 | 799,908 | 745,436 | 664,219 |
| <i>Goats</i> | 87,807 | 65,972 | 41,445 | 36,459 | 32,575 | 29,858 | 25,870 |

(1) Present territory, including the northern zone reannexed and Sub-Carpathia. — (2) Present territory, excluding Sub-Carpathia. — (3) Including buffaloes.

With regard to pigs the system of representative enumeration for 1939 and 1940 was adopted. The number of pigs in 1940 was of 4,648,563, against 5,808,000 in 1939.

Classification for 1940 is the following:

| | For fat | For meat | Total |
|---|-----------|----------|-----------|
| Pigs under 1 year | 2,860,548 | 790,803 | 3,651,351 |
| Boars for breeding | 20,564 | 5,563 | 26,127 |
| Sows for breeding | 458,056 | 97,205 | 555,261 |
| Pigs under 1 year, not for breeding | 371,339 | 44,385 | 415,724 |
| <i>Total</i> | 3,710,507 | 937,956 | 4,648,463 |

LIVESTOCK IN LITHUANIA.

| Classification | 30 June 1940 | 30 June 1939 | 30 June 1938 | 30 June 1937 | 30 June 1936 |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|
| <i>Horses</i> | 557,210 | 520,710 | 516,560 | 549,700 | 546,880 |
| Colts under 1 year | 40,790 | 38,410 | 37,900 | 40,920 | 38,890 |
| Horses 1 year old and under 3 | 72,190 | 67,630 | 67,360 | 66,290 | 63,140 |
| Horses 3 years old and above | 444,230 | 414,670 | 411,300 | 442,490 | 444,850 |
| <i>Cattle</i> | 1,188,500 | 1,103,550 | 1,097,340 | 1,163,000 | 1,148,500 |
| Calves under 1 year | 168,830 | 161,170 | 159,560 | 170,750 | 170,200 |
| Cattle 1 year old and above | 234,280 | 206,930 | 209,710 | 218,740 | 215,500 |
| Milk cows | 785,390 | 735,450 | 728,070 | 773,510 | 762,800 |
| <i>Sheep</i> | 1,262,960 | 1,223,600 | 1,208,420 | 1,288,500 | 1,275,400 |
| Sheep under 1 year old | 754,020 | 736,900 | 731,130 | 767,740 | 762,000 |
| Sheep 1 year old and above | 508,940 | 486,700 | 477,290 | 520,760 | 513,400 |
| <i>Pigs</i> | 1,160,480 | 1,117,080 | 1,093,120 | 1,183,530 | 1,210,000 |
| Pigs under 6 months old | 771,020 | 767,770 | 748,880 | 798,700 | 833,600 |
| Pigs 6 months old and above | 389,460 | 349,310 | 344,240 | 384,830 | 376,400 |
| <i>Poultry:</i> | | | | | |
| Hens and cocks (excluding chicks) | 2,236,560 | 1,996,800 | 1,973,390 | 2,229,880 | 2,176,700 |
| Geese | 888,110 | 858,300 | 848,360 | 852,960 | 893,600 |

LIVESTOCK IN SWITZERLAND

During last year, foddering conditions, production and sale of livestock breeding in Switzerland were exposed to the influence of many factors. A new inquiry about the quantity of the principal varieties of livestock corresponded to an absolute necessity of war economy. Cattle and pigs census, carried out on 1 April 1940, was no longer hindered by foot-and-mouth disease, as it was the case in the last two years. Census took place in all Communes with only one exception.

Cattle (number).

| Classification | 1940 | (1) 1939 | 1938 | 1937 | 1936 | 1935 |
|------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| <i>Calves not over 6 months:</i> | | | | | | |
| for slaughter | 56,729 | 57,800 | 53,854 | 51,775 | 58,209 | 64,843 |
| for rearing | 208,757 | 204,200 | 209,886 | 216,060 | 200,586 | 178,466 |
| <i>Young cattle from 6 months:</i> | | | | | | |
| to 1 year | 116,643 | 112,700 | 116,882 | 117,603 | 94,995 | 97,075 |
| <i>Heifers:</i> | | | | | | |
| from 1 to 2 years | 217,457 | 223,500 | 224,918 | 201,443 | 184,444 | 187,151 |
| over 2 years | 127,171 | 130,800 | 124,702 | 107,034 | 103,703 | 111,456 |
| <i>Cows</i> | 909,507 | 926,400 | 912,516 | 893,004 | 882,264 | 903,153 |
| <i>Bulls:</i> | | | | | | |
| from 1 to 2 years | 25,575 | 24,800 | 25,906 | 24,232 | 21,302 | 23,895 |
| over 2 years | 9,208 | 9,900 | 8,458 | 7,774 | 7,342 | 8,052 |
| <i>Oxen:</i> | | | | | | |
| from 1 to 2 years | 13,611 | 13,200 | 16,039 | 12,419 | 10,058 | 7,744 |
| over 2 years | 9,107 | 7,700 | 7,424 | 6,404 | 6,404 | 7,905 |
| TOTAL | 1,693,761 | 1,711,000 | 1,700,585 | 1,637,748 | 1,568,738 | 1,599,040 |

(1) The estimate of the total number for Switzerland is based on the differences in the numbers in the cantons covered by the census.

In agreement with the considerations stated at the time of 1939 census, the maximum recorded last year has proportionally little decreased. The fall is hardly 1 per cent. and the total number is actually that of 1,693,700 heads.

In some cantons and chiefly in the Grisons, the number of cattle in 1940 is even above that of last year's spring. In return some cantons of Central Switzerland show a decrease attaining 6 per cent. Older categories offer a particular interest in account of their number. The quantity of hay stocks being insufficiently known, the offer of older cows and heifers during last winter was sometimes so considerable that the authorities had to issue supplementary dispositions for their utilization. On the other hand, since the beginning of grass foddering, occurred a considerable decrease in the offer of big livestock for slaughtering, especially cows; the fall was equalized only during the last weeks by a more abundant market sale. It shows clearly from the census that the number of cows as well as that of heifers meets entirely the demands of the local market and eventual orders from abroad. Nothing alters the fact that the quantity of older heifers and cows decreased more remarkably than the total number of cattle, since other categories show a new increase. The unequal modification of contingents of age and return categories agrees in a certain way with the periodical variations and fluctuations of the quantity, due to several elements, such as price conditions, natural causes, various yields of fodder, and so on. Since 1939 this difference may also be attributed to war and the hope for a more favourable price development.

Although the number of cows amounting to 909,500 heads is considered important, it is 1.2 per cent. below the maximum of 1939. The decrease in the number of cows is the strongest in Central and West Switzerland, whereas in Western Switzerland the difference is not very noticeable. Nevertheless the total fall is greater than one might have foreseen, taking into consideration the reinforcement of the quantity of older heifers; this important fact could have brought on, without particular dispositions, a new increase of the number of cows. But the fall in the number of cows is fully explained by the increase of slaughtering, which derives chiefly from the greater demand of cows for slaughtering needed by the army or it is also due to supplementary dispositions of utilization, which were taken in order to compensate the abundant momentary offers of livestock for slaughtering already mentioned. If a certain surplus of cows were taken to the slaughter-house, on the other hand slaughtering decreased proportionally in the other categories and varieties. Marketing of cows will certainly be less important in the next few months than it was last year, but might equally well keep in the superior limits. Instead of the increase verified last year in the category of older heifers (127,200), a remarkable fall occurred; nevertheless the whole of this category decreased only by 3,600 heads, that is 3.2 per cent. below the maximum number of last year. During the second half of 1940, the number of older heifers will be rather considerably reduced, but no important difference will be shown.

Together with the inquiry about livestock, employment of cattle for yoking was the object of examination for the first time. According to the results recorded, 153,000 heads, that is more than 8 per cent. of the total

number, were trained and employed for carrying and drawing of loads. Although the answers were not complete, it results that in war time, cattle represent a very valuable stock for yoking. Besides employment of cattle is very different according to cantons and natural and economical conditions of enterprises. Whilst in French Switzerland one hardly finds cattle being exploited by yoking it to carts and ploughs, this is still the case in the cantons with small country farming, attaining a quarter of all cattle and 40 per cent. of age categories.

* * *

After the outbreak of hostilities, pigs breeding had a strong increase, due to a certain slackening in the quoting of pigs; it was also a question of intensifying meat and fat storing and the more rational use of housekeeping refuse, and so on. Such an increase was also favoured by the temporarily abundant offer of concentrated fodder and the decrease of the foot-and-mouth disease; nevertheless, chiefly considering farmers buying important quantities of fodder, prices stimulated the production only during the last three months of 1939. It seems finally that in many places it was hoped that on a later date prices might still improve. On the other hand the scarce potato crop should have advised a certain prudence.

| Classification | 1940 | (1) 1939 | 1938 | 1937 | 1936 | 1935 |
|--|----------------|----------------|----------------|----------------|----------------|------------------|
| Young pigs up to 2 months | 219,576 | 203,700 | 229,711 | 242,085 | 202,117 | 269,429 |
| sucking pigs | (160,066) | (141,900) | (167,948) | (177,306) | — | — |
| other (weaned) | (59,510) | (61,800) | (61,763) | (64,779) | — | — |
| Young pigs from 2 to 6 months | 456,344 | 420,400 | 434,986 | 437,374 | 394,240 | 435,642 |
| from 4 to 6 months | (240,196) | (203,000) | (207,720) | (209,594) | (206,422) | — |
| Pigs for fattening over 6 months | 204,237 | 180,800 | 183,579 | 178,405 | 108,838 | 288,356 |
| Sows | 75,064 | 72,000 | 71,531 | 74,609 | 79,001 | 90,824 |
| in farrow | (43,397) | (51,300) | (47,889) | (52,523) | (50,737) | (56,423) |
| in farrow for the first time | — | (19,200) | (17,088) | (18,065) | — | — |
| others | — | (32,100) | (30,801) | (34,458) | — | — |
| not in farrow | (31,667) | (20,700) | (23,642) | (22,086) | (28,324) | (34,401) |
| Boars | 3,242 | 3,100 | 3,000 | 3,155 | 3,255 | 4,128 |
| TOTAL | 958,463 | 880,000 | 922,807 | 835,628 | 877,511 | 1,088,379 |

(1) The estimate of the total number for Switzerland is based on the differences in the numbers in the cantons covered by the census.

The important total (958,400 pigs, that is an increase of 78,460 heads) shows a relatively small increase in comparison with the number of their owners. An increase was to be expected after the results of last autumn census. The considerable quantities of young pigs verified at this period have passed, with some protraction of fattening, to the category of pigs for fattening and have been still reinforced by an extension of breeding. Variations and increases of quantity, however, differ from canton to canton.

It seems that the slackening in pigs quoting persuaded many an owner to increase his quantity without considering changes and instabilities which may quite possibly occur during war in fodder storing. Also repercussions of the important cattle quantity and variations in the consumption were not sufficiently taken into consideration.

POULTRY-FARMING IN SWITZERLAND

As the breeding of fowls depends principally on the importation of breed from abroad, the fowl-breeding was also included in the 21 April 1940 statement. Last April 235,300 people were still keeping fowls, that is 17,000 or 6.8 per cent. less than in 1936. A comparison is only possible with the 1936 statements; thus the fall may hardly be exclusively ascribed to the economic war time conditions. Such a decrease is very likely due to the rather deceptive returns of many a poultry-farming exploitation as well as to other causes.

Poultry-breeding.

| YEARS | Number of owners | Chicks under 2 months | Laying hens | Other | Total |
|-------|------------------|-----------------------|-------------|---------|-----------|
| 1918 | 251,304 | — | — | — | 2,383,527 |
| 1921 | 270,202 | — | — | — | 3,247,243 |
| 1926 | 289,262 | — | — | — | 4,115,853 |
| 1931 | 281,193 | 353,957 | 4,410,502 | — | 4,864,459 |
| 1936 | 252,470 | 1,168,308 | 4,213,762 | 161,078 | 5,544,148 |
| 1940 | 235,342 | 640,536 | 3,782,853 | 215,319 | 4,638,748 |

The total of 4,638,000 fowls includes 3,782,800 laying hens, 640,500 chicks under 2 months, 138,157 cocks and 77,200 young cocks and hens over 2 months.

The relatively inconsiderable part of the last category is due to the fact that the incubation period was just beginning at the moment of the statement and that poultry exploitation with permanent breeding is still uncommon.

The decrease of 905,000 heads is localized in the number of laying hens and chicks under 2 months. The latter figure with 528,000 heads and a loss of 45.2 per cent. Consequently the decrease in poultry-farming makes itself felt in the breeding of the youngest classes rather than by the elimination of other categories. In many a poultry exploitation, however, elimination of older fowl could only be profitable.

As for the decrease in the number of chickens, except the ones purposely suppressed, the bad results of the incubations during the cold weather of this spring are to be held responsible.

The decrease reached the greatest proportions in the cantons in which breeding is best organized for sale and where fodder is imported from abroad, whereas in the mountainous cantons the difference of the total amount as well as of the breeding keeps in modest limits.

WORLD TRADE IN EGGS IN THE SHELL IN THE LAST TEN YEARS

General considerations.

Under the present circumstances, a sketch of world trade in eggs in the shell shows great difficulties because of lack of statistical data from some of the principal countries which participate in such a trade. Indeed, owing the war, the countries in Europe which have published trade statistics for the whole year 1939 are few; numerous on the contrary are those which have published the data only for seven, eight or nine months of that year. This is the reason why a comparison of the trade of 1939 with that of previous years is not always possible. On the other hand trade in eggs in 1939, as well as trade in other branches, shows an irregular aspect because of the war operations which began in the first days of September in countries especially important for such a trade.

In spite of the missing and imperfect information available, we did not give up examining, even if approximately, the international trade in eggs in 1939, comparing it with that of previous years.

The following article is subdivided in 4 parts: (1) Export trade in 1939 of the 27 principal countries; (2) Import trade in 1939 of 9 countries; (3) Export trade of 8 countries during the first quarter of 1940; and (4) Variations in the prices of eggs.

I. — Countries exporting eggs in the shell.

The trade in eggs in the shell during the year 1939 had started by showing a strong increase in comparison with 1938, as the result of a progressing improvement of conditions as to poultry-farming in the exporting countries and a constant demand of the importing countries. In truth, the most important exporting countries in the world, Denmark and the Netherlands, and some other important exporting countries, increased their exports in 1939 strongly, in comparison with 1938 as well as with the five years average.

In 1939 Denmark had a record-export of 236 million lb., against 215 million lb. in 1938 and an average of 145 million lb. during the period from 1930 to 1934, showing an increase respectively of 10 per cent. and of 62.4 per cent.

I A). — *World Trade in Eggs in the Shell. — Exports.*

(thousand lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | Average 1930-34 | % of 1939 | |
|---|-------------------------|---------|---------|---------|---------|--------------------|---------------|------------------|
| | | | | | | | 1938 = 100 | Average = 100 |
| Major Northwestern European exporting countries: | | | | | | | | |
| Denmark | 236,103 | 214,718 | 222,240 | 193,146 | 161,524 | 145,411 | 110.0 | 162.4 |
| Netherlands | 223,675 | 194,642 | 167,902 | 142,720 | 136,251 | 164,241 | 114.9 | 136.2 |
| Ireland | (¹) 39,996 | 45,068 | 40,656 | 49,057 | 50,511 | 66,687 | ... | ... |
| Belgo-Luxemb. Economic Union | 13,211 | 17,869 | 27,706 | 26,073 | 24,148 | 61,035 | 73.9 | 21.6 |
| Total | ... | 472,297 | 458,504 | 410,996 | 372,434 | 437,374 | ... | ... |
| Eastern and Southeastern European exporting countries and U. S. S. R.: | | | | | | | | |
| Poland | (¹) 29,869 | 64,137 | 58,157 | 53,169 | 50,601 | 81,723 | ... | ... |
| Bulgaria | 32,690 | 33,466 | 38,616 | 38,559 | 28,164 | 39,944 | 97.7 | 81.8 |
| Yugoslavia | 31,475 | 29,147 | 27,039 | 25,577 | 24,546 | 45,608 | 108.0 | 69.0 |
| Hungary 3) | 22,828 | 31,047 | 25,266 | 15,285 | 18,201 | 23,183 | 73.5 | 98.5 |
| Romania | 32,004 | 21,590 | 22,855 | 26,475 | 15,213 | 26,933 | 148.2 | 118.8 |
| U. S. S. R | ... | — | 476 | 220 | 20 | 17,919 | ... | ... |
| Total | ... | 179,387 | 172,409 | 159,285 | 136,745 | 235,310 | ... | ... |
| France and Italy: | | | | | | | | |
| France | (⁴) 4,468 | 5,091 | 851 | 2,443 | 2,760 | 13,189 | ... | ... |
| Italy | (⁴) 1,224 | 2,094 | 523 | 87 | 570 | 10,533 | ... | ... |
| Total | (⁴) 5,692 | 7,185 | 1,374 | 2,530 | 3,330 | 23,722 | ... | ... |
| Minor Baltic exporting countries: | | | | | | | | |
| Lithuania | 12,419 | 10,556 | 9,322 | 8,362 | 3,331 | 4,985 | 117.7 | 249.1 |
| Estonia | (¹) 5,120 | 5,330 | 5,296 | 5,738 | 6,302 | 3,522 | ... | ... |
| Latvia | (¹) 1,766 | 2,106 | 3,122 | 1,239 | 397 | 134 | ... | ... |
| Total | ... | 17,992 | 17,740 | 15,339 | 10,030 | 8,641 | ... | ... |
| Fennoscandian countries: | | | | | | | | |
| Finland | 15,345 | 17,372 | 19,681 | 17,086 | 19,246 | 12,573 | 88.3 | 122.0 |
| Sweden | (¹) 11,126 | 11,828 | 9,077 | 5,745 | 6,824 | 8,150 | ... | ... |
| Norway | 3,328 | 3,487 | 2,757 | 2,656 | 1,382 | 2,645 | 95.4 | 125.8 |
| Total | ... | 32,687 | 31,515 | 25,487 | 27,452 | 23,368 | ... | ... |
| North and South America: | | | | | | | | |
| Canada | 2,107 | 3,047 | 2,649 | 1,991 | 2,151 | 1,681 | 69.2 | 125.3 |
| United States | 4,459 | 3,460 | 3,929 | 3,469 | 2,996 | 10,707 | 128.9 | 41.6 |
| Argentina | 20,816 | 13,536 | 5,455 | 7,740 | 10,934 | 3,627 | 153.8 | 573.8 |
| Uruguay | 6,591 | 5,438 | 2,613 | 5,360 | 9,612 | 3,825 | 121.2 | 172.3 |
| Total | 33,973 | 25,481 | 14,646 | 18,560 | 25,693 | 19,840 | 133.3 | 171.2 |
| China and Turkey: | | | | | | | | |
| China | 38,145 | 34,013 | 55,396 | 55,320 | 41,170 | 62,218 | 112.1 | 61.3 |
| Turkey | 13,584 | 6,416 | 6,687 | 12,730 | 13,416 | 42,082 | 211.7 | 32.3 |
| Total | 51,729 | 40,429 | 62,083 | 68,050 | 54,586 | 104,300 | 127.9 | 49.6 |
| North African countries: | | | | | | | | |
| French Morocco | (¹) 4,755 | 13,732 | 21,796 | 22,472 | 22,995 | 20,702 | ... | ... |
| Egypt | 8,946 | 4,400 | 6,270 | 8,388 | 6,442 | 16,538 | 203.3 | 54.1 |
| Total | ... | 18,132 | 28,066 | 30,860 | 29,437 | 37,240 | ... | ... |
| Australia | 16,479 | 16,764 | 18,693 | 25,629 | 29,373 | 24,330 | 98.3 | 67.7 |
| General total | ... | 810,354 | 805,030 | 756,736 | 689,080 | 914,125 | ... | ... |

(¹) First eight months. — (²) First six months. — (³) Eggs in the shell and egg products. — (⁴) First seven months. — (⁵) First nine months.

Simultaneously also the Netherlands exceeded at for the first time 1 million quintals (220.5 million lb.) attaining a quantity respectively 14.9 per cent. and 36.2 per cent. above the export of 1938 and the average.

Ireland exported 40 million lb. during the first eight months of 1939, that is much more than $\frac{2}{3}$ of the total export in 1938 but less than the export of the 8 corresponding months of 1938, which amounted to 41 million lb.

In the Belgo-Luxemburg Economic Union, a decreasing tendency of exports became more evident in 1939, as exports fell down to the minimum for the ten years period taken into account.

The third eggs exporting country in the world, Poland, exported only 30 million lb. during the first half of 1939, against 35 million lb. during the corresponding period of 1938.

In the South-Western European group, the increase of exports of eggs was considerable in Romania, with regard to 1938 (48.2 per cent.) as well as to the average (18.8 per cent.).

Exports of Bulgaria and Hungary in 1939, on the contrary, were lower than in 1938 and the average, whereas exports of Yugoslavia, though they were 8 per cent. above those of 1938, were not less than 31 per cent. below the average.

During 1938 and 1939 the U. S. S. R. stopped completely eggs exports. The maximum export of this country during the last ten years was in 1931 with 45,058 thousand lb.

During the first seven months of 1939 eggs exports of France had remarkably progressed in comparison with those of the corresponding period of 1938, increasing from 1,144 thousand lb. to 4,468 thousand lb. (of which 2,930 thousand lb. were sent to Switzerland and 1,280 thousand lb. to the United Kingdom).

Italian exports during the first seven months of 1939 have on the contrary slightly decreased in comparison with the corresponding period of 1938, falling from 1,396 thousand lb. to 1,224 thousand lb.

The three Baltic countries, Latvia, Estonia and Lithuania, greatly increased their eggs exports during the last ten years. Their average global export was only 8,641 thousand lb. during the period 1930-1934 whereas in 1938 it attained 17,992 thousand lb. In 1939, admitting the same percentage of increase verified for Lithuania as well as Estonia and Latvia, their total export could be estimated at 21,160 thousand lb. During the year 1939 the three countries gave special attention to poultry-farming and trade in eggs. The trade was put under severe control and the Government guaranteed the producers suitable prices.

Finland's, Sweden's and Norway's contribution to the world export in 1939 was certainly less than in 1938, but much above the average. Especially in Finland and Norway the excessive increase of price for poultry feed during the last three months of 1939 caused serious difficulties to poultry farmers who were compelled to reduce their flocks.

A very considerable increase of eggs exports was recorded on the other hand in the group of American countries, thanks mainly to Argentina. Taking into consideration the fact that exports of this country in 1930 scarcely amounted to 1,600 thousand lb. and that only since 1932 eggs exports in

that country exceeded imports, the export of 20,816 thousand lb. attained in 1939 proves the very rapid development of its poultry farming. Owing to the almost unrestricted abundance of poultry feed and the relatively small population of the country, Argentina might become one of the first eggs exporting countries in the world. Uruguay too considerably increased her exports in 1939, with regard to 1938 as well as to the average. In 1939 the exports of the United States, though remaining 58.4 per cent. below the average, show a certain revival after the tendency to decrease which started in 1932 and lasted till 1938. Canada, the eggs exports of which kept to a more modest level, exported in 1939 hardly 69.2 per cent. of the quantity exported in 1938, but still remains considerably above the average.

Although hostilities still continue in China, this country increased its exports of eggs in the shell in 1939, as compared with 1938, but it is still 48.7 per cent. below the average.

In Turkey, the decrease in exports, occurred in 1933, lasted till 1938: its exports fell from 54,572 thousand lb. in 1932 to only 6,416 thousand lb. in 1938. The principal causes of this regression are the strong competition of exporting countries of North-West Europe as well as the loss of the Spanish market, where Turkey was the most important supplier till 1935. The energetic measures taken by the Turkish Government to intensify poultry-farming and to control trade in eggs started to give results in 1939, when Turkish exports amounted to 13,584 thousand lb., exceeding 11.7 per cent. that of 1938.

In the North-African countries, French Morocco reduced its exports from 6,183 thousand lb. during the first half of 1938 to 4,755 thousand lb. during the corresponding period for 1939. The exports of this country kept during the last ten years period to a rather constant level; only in 1938 they were exceptionally low.

On the other hand the exports of Egypt show a definite revival after the reduction during the five years period 1934-1938. Between the export of Egypt and that of Turkey there is a clear parallelism, although the reduction of eggs export in Egypt has not taken such proportions as in Turkey. Both countries suffered from the heavy competition of other countries and the loss of the Spanish market.

With regard to Australia, her export continuously decreased from 1934 till 1939, falling from 36,225 thousand lb. in 1934 (the maximum attained during the last fourteen years) to 16,479 thousand lb. in 1939. The decrease in 1939 must be partly ascribed to the heavy losses of poultry flocks on account of the exceptional heat and drought.

In the following table we have collected in geographical groups the estimates of the eighteen exporting countries which in 1939 published their trade statistics.

Among the important exporting countries only Poland and Ireland are missing; therefore the exports of the eighteen countries included may be considered as giving a sufficient indication of the tendency of the world trade.

All groups taken into consideration, except the Finland-Norway group and Australia, increased their exports in 1939 with respect to 1938. The total for

I. B). — *World Trade in Eggs in the Shell. — Exports.*

Recapitulation of the exports of 18 countries which dispose of the figures for the whole year 1939.

(thousand lb.).

| GROUPS OF COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | Average 1930-34 | % of 1939 | |
|--|----------------|----------------|----------------|----------------|----------------|--------------------|---------------|------------------|
| | | | | | | | 1938 = 100 | Average = 100 |
| Major Northwestern European exporting countries: | | | | | | | | |
| Denmark, Netherlands and Belgo-Luxemburg Economic Union. | 472,989 | 427,229 | 417,848 | 361,939 | 321,923 | 370,687 | 110.7 | 127.6 |
| Southeastern European exporting countries: | | | | | | | | |
| Bulgaria, Yugoslavia, Hungary and Romania | 118,997 | 115,250 | 113,776 | 105,896 | 86,124 | 135,368 | 103.3 | 87.7 |
| Baltic countries: | | | | | | | | |
| Lithuania | 12,419 | 10,556 | 9,322 | 8,362 | 3,331 | 4,985 | 117.7 | 249.1 |
| Fennoscandian countries: | | | | | | | | |
| Finland and Norway | 18,673 | 20,859 | 22,438 | 19,742 | 20,628 | 15,218 | 89.5 | 122.7 |
| North and South America: | | | | | | | | |
| Canada, United States, Argentina and Uruguay | 33,973 | 25,481 | 14,646 | 18,560 | 25,693 | 19,840 | 133.3 | 171.2 |
| China and Turkey | 51,729 | 40,429 | 62,083 | 68,050 | 54,586 | 104,300 | 127.9 | 49.6 |
| North African countries: | | | | | | | | |
| Egypt | 8,946 | 4,400 | 6,270 | 8,388 | 6,442 | 16,538 | 203.3 | 54.1 |
| Australia | 16,479 | 16,764 | 18,693 | 25,629 | 29,373 | 24,330 | 98.3 | 67.7 |
| Total of 18 countries . . . | 734,205 | 660,968 | 665,076 | 616,566 | 548,100 | 691,566 | 111.1 | 106.2 |

1939 is higher than that of 1938 by 73,200 thousand lb., that is to say by 11.1 per cent. With respect to the average the situation is less uniform. The groups which during the last ten years have regularly increased their exports are: (1) the North-Western European countries which form the relatively most important group in the world trade; their exports for 1939 exceeded the average by not less than 27.6 per cent; (2) the Baltic countries and (3) the group of the American countries. The exports of the Scandinavian countries equally increased during the last ten years; only in 1939 there was a decrease. The exports of the other groups of countries or individual countries taken into consideration, although showing an increase with respect to 1938, have not yet reached the level of the 1930-34 average. Among the latter are the exports of the China-Turkey group, which are at present still very much below the average. Nevertheless, the global exports in 1939 of the eighteen countries taken into consideration are above the average by 6.2 per cent.

The following table shows the proportional distribution by countries, of the global export.

I C). — *World Trade in Eggs in the Shell. — Exports.*
Relative importance of the principal egg-exporting countries and groups of countries.
 (Percentages).

| COUNTRIES | 1938 | 1937 | 1936 | 1935 | Average 1930-34 |
|---|-------|-------|-------|-------|--------------------|
| | % | % | % | % | % |
| Major Northwestern European exporting countries: | | | | | |
| Denmark | 26.5 | 27.6 | 25.5 | 23.4 | 15.9 |
| Netherlands | 24.0 | 20.9 | 18.9 | 19.8 | 18.0 |
| Ireland | 5.6 | 5.1 | 6.5 | 7.3 | 7.3 |
| Belgo-Luxemb. Economic Union | 2.2 | 3.4 | 3.4 | 3.5 | 6.6 |
| <i>Total</i> | 58.3 | 57.0 | 54.3 | 54.0 | 47.8 |
| Eastern and Southeastern European exporting countries and U. S. S. R.: | | | | | |
| Poland | 7.9 | 7.2 | 7.0 | 7.3 | 8.9 |
| Bulgaria | 4.1 | 4.8 | 5.1 | 4.1 | 4.4 |
| Yugoslavia | 3.6 | 3.4 | 3.4 | 3.6 | 5.0 |
| Hungary (1) | 3.8 | 3.1 | 2.0 | 2.6 | 2.5 |
| Romania | 2.7 | 2.8 | 3.5 | 2.2 | 2.9 |
| U. S. S. R. | ... | 0.1 | 0.03 | 0.003 | 2.0 |
| <i>Total</i> | 22.1 | 21.4 | 21.0 | 19.8 | 25.7 |
| France and Italy: | | | | | |
| France | 0.6 | 0.1 | 0.3 | 0.4 | 1.4 |
| Italy | 0.3 | 0.1 | 0.01 | 0.1 | 1.2 |
| <i>Total</i> | 0.9 | 0.2 | 0.3 | 0.5 | 2.6 |
| Minor Baltic exporting countries: | | | | | |
| Lithuania | 1.3 | 1.1 | 1.1 | 0.5 | 0.5 |
| Estonia | 0.7 | 0.7 | 0.8 | 0.9 | 0.4 |
| Latvia | 0.3 | 0.4 | 0.2 | 0.1 | 0.01 |
| <i>Total</i> | 2.3 | 2.2 | 2.1 | 1.5 | 0.9 |
| Fennoscandian countries: | | | | | |
| Finland | 2.1 | 2.5 | 2.3 | 2.8 | 1.4 |
| Sweden | 1.5 | 1.1 | 0.8 | 1.0 | 0.9 |
| Norway | 0.4 | 0.3 | 0.3 | 0.2 | 0.3 |
| <i>Total</i> | 4.0 | 3.9 | 3.4 | 4.0 | 2.6 |
| North and South America: | | | | | |
| Canada | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 |
| United States | 0.4 | 0.5 | 0.5 | 0.4 | 1.2 |
| Argentina | 1.7 | 0.7 | 1.0 | 1.6 | 0.4 |
| Uruguay | 0.7 | 0.3 | 0.7 | 1.4 | 0.4 |
| <i>Total</i> | 3.1 | 1.8 | 2.5 | 3.7 | 2.2 |
| China and Turkey: | | | | | |
| China | 4.2 | 6.9 | 7.3 | 6.0 | 6.8 |
| Turkey | 0.8 | 0.8 | 1.7 | 1.9 | 4.6 |
| <i>Total</i> | 5.0 | 7.7 | 9.0 | 7.9 | 11.4 |
| North African countries: | | | | | |
| French Morocco | 1.7 | 2.7 | 2.9 | 3.4 | 2.3 |
| Egypt | 0.5 | 0.8 | 1.1 | 0.9 | 1.8 |
| <i>Total</i> | 2.2 | 3.5 | 4.0 | 4.3 | 4.1 |
| Australia | 2.1 | 2.3 | 3.4 | 4.3 | 2.7 |
| General total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

(1) Eggs in the shell and egg products.

The group of the North-Western European exporting countries keeps a preponderant position; the relative importance of this group improves without interruption from an average of 47.8 per cent. to 58.3 per cent. in 1938. Among them Denmark shows the most remarkable increase by passing from an average of 15.9 per cent. to 27.6 per cent. in 1937, and 26.5 per cent. in 1938. The relative importance of the Netherlands, although the increase was less regular, went from an average of 18.0 per cent. to 24.0 per cent. in 1938. A contrary development is to be noticed in the group of countries of Eastern and South-Eastern Europe, and the U. S. S. R. The relative importance of this group diminished from an average of 25.7 per cent. to 22.1 per cent. in 1938, on account of the reduction and finally the suspension of exports of the U. S. S. R. In this group also figures the third egg-exporting country of the world, namely Poland; her relative importance, which showed an average of 8.9 per cent., decreased after various fluctuations, during the 1935-1937 period, to 7.9 per cent. in 1938.

The exports of Bulgaria show from year to year a much greater stability.

The third group of exporters is that of China and Turkey. The relative importance of this group also diminished constantly during the last four years, from an average of 11.4 per cent. to only 5.0 per cent. in 1938.

The group of the Fennoscandian countries, that of the American countries and that of Baltic countries, achieved considerable progress in the export of eggs during the last years, as their relative importance passed respectively from an average of 2.6 per cent., 2.2 per cent. and 0.9 per cent. to 4.0 per cent., 3.1 per cent. and 2.3 per cent. in 1938. The other groups: France-Italy, French-Morocco, Egypt and Australia show a tendency to reduction, their relative global importance decreasing from an average of 9.4 per cent. to 5.2 per cent. in 1938.

Distribution of exports of Denmark, the Netherlands, and Poland, according to countries of destination.

The list of the countries to which Denmark supplies eggs is very short. Until 1932 Denmark exported only into three foreign countries: the United Kingdom, Germany and Sweden. In 1932, beyond the three above mentioned countries, Switzerland and former Czechoslovakia figure as countries of destination with moderate percentages. Later the list increased by the addition of Spain, the Belgo-Luxemburg Economic Union and France. However the most important countries of destination still remain the United Kingdom and Germany which absorbed an average of 93.1 per cent. of the total exports during the period 1930-1934.

This percentage fell in 1935 to 88.2 per cent. rising subsequently without interruption until 1938, when it attained 98 per cent.; in 1939 it fell again to 96.1 per cent. During the period 1930-1934 supplies to the United Kingdom represented an average of 72.5 per cent. and those directed to Germany 20.6 per cent. of the total eggs export of Denmark. The cause of this affirmation

II. — *Exports of Eggs in the Shell from Denmark, by destination.*

(thousand lb.)

| DESTINATION | 1939 | | 1938 | | 1937 | | 1936 | | 1935 | | Average 1930-1934 | |
|---|------------------|--------------|------------------|--------------|------------------|--------------|------------------|--------------|------------------|--------------|----------------------|--------------|
| | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % |
| United Kingdom | 160,712 | 68.1 | 157,404 | 73.3 | 166,520 | 74.9 | 132,785 | 68.7 | 106,656 | 66.0 | 105,401 | 72.5 |
| Germany | 66,127 | 28.0 | 53,066 | 24.7 | 48,794 | 22.0 | 46,338 | 24.0 | 35,754 | 22.2 | 29,951 | 20.6 |
| Sweden | | | 59 | 0.0 | 1,596 | 0.7 | 1,492 | 0.8 | 0 | 0.0 | 476 | 0.3 |
| Switzerland | | | 4,018 | 1.9 | 4,701 | 2.1 | 10,162 | 5.3 | 12,951 | 8.0 | 4,081 | 2.8 |
| Spain | | | — | — | 20 | 0.0 | 1,476 | 0.8 | 4,609 | 2.9 | 4,213 | 3.0 |
| Belgo-Luxemburg Economic Union | | | 2 | 0.0 | — | — | 79 | 0.0 | 225 | 0.1 | 718 | 0.5 |
| Former Czechoslo- vakia | 9,264 | 3.9 | — | — | 557 | 0.3 | 664 | 0.3 | 1,159 | 0.7 | 299 | 0.2 |
| France | | | 99 | 0.1 | 3 | 0.0 | 90 | 0.1 | 80 | 0.1 | 42 | 0.0 |
| The Faeroes | | | 35 | 0.0 | 32 | 0.0 | 31 | 0.0 | 42 | 0.0 | 20 | 0.0 |
| Greenland | | | 11 | 0.0 | 12 | 0.0 | 10 | 0.0 | 10 | 0.0 | 5 | 0.0 |
| Other countries | | | 24 | 0.0 | 5 | 0.0 | 19 | 0.0 | 38 | 0.0 | 205 | 0.1 |
| Total | 236,103 | 100.0 | 214,718 | 100.0 | 222,240 | 100.0 | 193,146 | 100.0 | 161,524 | 100.0 | 145,411 | 100.0 |

(1) Average 1931-1934. — (2) Average 1933 and 1934. — (3) Average of the totals for the five years ending 1934.

of the Danish product on the markets of the United Kingdom and Germany is not only to be ascribed to a favourable geographical position, but mainly to the good quality of Danish eggs and to the improvement of the commercial organisation. In 1939 the Danish Government continued to take measures likely to increase the competition capacity of the Danish product, aiming to improve the quality of the eggs and to guarantee the producer a price in proportion with the quality. Besides it is intended to entrust trade in eggs only to such persons as are authorized by the State, and to establish export control for each shipment not only with regard to the exporter but also to the producer.

During the first eight months of 1939 Danish exports were very intense, exceeding considerably those of the corresponding period of 1938. During the last four months of 1939, the unfavourable effects of war were felt in the Danish poultry industry; these effects consisted chiefly in the difficulty of procuring freely the concentrated feed necessary for poultry. The trade in eggs suffers strongly from the rise of freight prices and insurance taxes for sea transports.

Beside Denmark by order of importance figure the Netherlands and a noticeable parallelism exists between their exports. The Netherlands as well have as chief customers the United Kingdom and Germany and they export important quantities to further away countries only in years of crisis.

During the period 1930-1934 the average eggs exports of the Netherlands to the United Kingdom and Germany combined represented 94.3 per cent. of the global exports. This percentage fell to 87.7 per cent. in 1935, and to 84.8

III. — *Exports of Eggs in the Shell from the Netherlands, by destination.*

(thousand lb.)

| DESTINATION | 1939 | | 1938 | | 1937 | | 1936 | | 1935 | | Average 1930-1934 | |
|---------------------------------------|------------------|-------|------------------|-------|------------------|-------|------------------|-------|------------------|--------------------|----------------------|-------|
| | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % |
| Germany | 67,867 | 30.3 | 73,095 | 37.6 | 70,029 | 41.7 | 51,433 | 36.0 | 70,923 | 52.0 | 119,789 | 72.9 |
| United Kingdom . . | 150,757 | 67.4 | 116,108 | 59.6 | 88,164 | 52.5 | 69,649 | 48.8 | 48,608 | 35.7 | 35,200 | 21.4 |
| Belgo-Luxemburg Economic Union . . | 1,038 | 0.5 | 983 | 0.5 | 1,500 | 0.9 | 11,679 | 8.2 | 5,185 | 3.8 | 2,222 | 1.4 |
| Spain | — | — | 1,592 | 0.8 | 3,815 | 2.3 | 5,046 | 3.5 | 7,866 | 5.8 | 3,022 | 1.8 |
| Switzerland | 2,414 | 1.1 | 1,785 | 0.9 | 3,057 | 1.8 | 1,847 | 1.3 | 1,254 | 0.9 | 894 | 0.6 |
| France | — | — | 370 | 0.2 | 547 | 0.3 | 527 | 0.4 | 397 | 0.3 | 444 | 0.3 |
| Former Czechoslo- vakia | — | — | — | — | — | — | 76 | 0.1 | 137 | 0.1 ⁽¹⁾ | 186 | 0.1 |
| Other countries . . | 1,599 | 0.7 | 709 | 0.4 | 790 | 0.5 | 2,463 | 1.7 | 1,901 | 1.4 | 2,521 | 1.5 |
| Total | 223,675 | 100.0 | 194,642 | 100.0 | 167,902 | 100.0 | 142,720 | 100.0 | 136,251 | 100.0 | 164,241 | 100.0 |

⁽¹⁾ Average of 4 years. — ⁽²⁾ Average of the totals for the five years ending 1934.

per cent. in 1936, and rose rapidly during the last three years to attain 97.7 per cent. in 1939.

It is interesting to notice that during the last four years the first place was held by the United Kingdom, whereas till the whole of 1935 Germany was the first customer of the Netherlands, followed by the United Kingdom. Let aside the United Kingdom and Germany, the Netherlands sent noticeable quantities only during the period 1934-1936 and precisely to Spain and the Belgo-Luxemburg Economic Union. Eggs from the Netherlands were regularly sent to the Swiss market during the last ten years, but in modest quantities with a maximum of 3,057 thousand lb. in 1937.

During the whole of 1939, the Government favoured eggs exports by means of export premiums. The necessary funds were obtained from the revenues deriving from the duty taxes on imports of cereals. The organisation and control of the trade in eggs were still further improved and exports attained their record-figures during the last ten-years.

As in Denmark, poultry-farming in the Netherlands suffered from the effects of war during the last four months of 1939. Towards the middle of September 1939 the Government of the Netherlands took into consideration a reduction of 20 per cent. of the poultry flocks owing to the difficulties in procuring the necessary concentrated feed.

As for Poland only the export estimates during the first half of 1939 are available. They are about 4,700 thousand lb. below those of 1938. If the proportion of exports to the United Kingdom during that period remained on the level of that of 1938, the exports to Germany decreased rapidly.

During the first six months of 1939, relatively more important quantities of eggs than during previous years were sent to Italy; whereas exports to Swit-

zerland kept stationary on the level of 1938. There was no supply of eggs to Spain during the first six months of 1939, although Poland has always been one of the most important suppliers of Spain, where in 1935 she had sent the record-quantities of the last ten years (12,623 thousand lb.).

IV. — Exports of Eggs in the Shell from Poland, by destination.

(thousand lb.)

| DESTINATION | First six months 1939 | | 1938 | | 1937 | | 1936 | | 1935 | | Average 1930-1934 | |
|---------------------------------|-----------------------|----------------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|------------------------------|--------------|
| | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % | Absolute data | % |
| United Kingdom | 17,034 | 57.0 | 36,580 | 57.0 | 31,397 | 54.0 | 34,690 | 65.2 | 27,432 | 54.2 | 25,000 | 29.1 |
| Germany | 3,257 | 10.9 | 9,602 | 15.0 | 5,210 | 9.0 | 3,504 | 6.6 | — | — | 18,937 | 22.1 |
| Austria | | | | | 2,165 | 3.7 | 2,473 | 4.7 | 2,557 | 5.1 | 9,782 | 11.4 |
| Former Czechoslovakia | (¹) 194 | (¹) 0.7 | 4,039 | 6.3 | 3,402 | 5.8 | 4,260 | 8.0 | 3,820 | 7.5 | 11,059 | 12.9 |
| Italy | 4,850 | 16.2 | 7,452 | 11.6 | 9,037 | 15.5 | 1,002 | 1.9 | 720 | 1.4 | (²) 7,078 | 8.3 |
| Switzerland | 2,898 | 9.7 | 5,625 | 8.8 | 4,626 | 8.0 | 2,074 | 3.9 | 2,109 | 4.2 | (³) 3,037 | 3.5 |
| Spain | — | — | 182 | 0.3 | 1,908 | 3.3 | 3,877 | 7.3 | 12,623 | 24.9 | (⁴) 5,041 | 5.9 |
| France | — | — | — | — | 341 | 0.6 | 754 | 1.4 | 900 | 1.8 | 3,236 | 3.8 |
| Other countries | 1,636 | 5.5 | 657 | 1.0 | 71 | 0.1 | 535 | 1.0 | 440 | 0.9 | 2,591 | 3.0 |
| Total | 29,869 | 100.0 | 64,137 | 100.0 | 58,157 | 100.0 | 53,169 | 100.0 | 50,601 | 100.0 | (⁴) 81,623 | 100.0 |
| Argentina | (1,624) | (5.4) | (631) | (1.0) | — | — | — | — | — | — | (¹) (145) | (0.2) |

(¹) For the months May and June, export into the Protectorate Bohemia and Moravia. — (²) Average of 4 years. — (³) Average of 3 years. — (⁴) Average of the totals for the five years ending 1934. — (⁵) Average of 2 years.

Italy and France, after having been important exporting countries, became chiefly importing countries. The maximum quantity exported by Italy amounted in 1925 to 66,919 thousand lb. From this date onward the Italian exports diminished regularly until 1938. At the same time imports increased almost regularly from 1925 to 1932, attaining their maximum in 1932 (77,138 thousand lb.). From this date onward the imports fell again until 1936, owing to the measures taken by the Government for the protection of national poultry-farming and the restrictions which were imposed on import trade. Since 1937 imports rose again. Import estimates for the first seven months of 1939 still show a strong increase.

During the year 1939 Italy took measures for the regulation of her trade in eggs by creating two institutions which ruled the trade in eggs with foreign countries, the trade in poultry and deriving products and have also the purpose of pushing the national poultry-industry. Besides it the fact must be stressed that in 1939 the Italian purchase on the Albanian market were facilitated by the Custom Union between the two countries.

Eggs exports of France attained its maximum of 89,547 thousand lb. in 1928. Since then the exports diminished almost continuously till 1937. In 1938 as well as in 1939 they showed a revival judging by the exports during the first

seven months. Eggs imports of France increased regularly from 1925 to 1931 when they reached their maximum of 67,643 thousand lb. From that date onward, although not showing a regular development, they kept to a level which is much above the exports. The biggest amount of French eggs imports during the last years came from her colonies and protectorates, especially from French Morocco. Towards the middle of 1939 the French Government took steps to reorganize the egg-market by introducing standardization of eggs for sale.

*V. — Trade of Italy and France in Eggs in the Shell
during the last fourteen years.*

(thousand lb.)

| YEARS | Italy | | | France | | |
|---------------------------|---------|---------|--|---------|---------|--|
| | Imports | Exports | Surplus of imports (+) or of exports (—) | Imports | Exports | Surplus of imports (+) or of exports (—) |
| 1939 (first 7 months) . . | 17,382 | 1,224 | + 16,158 | 9,494 | 4,468 | + 5,026 |
| 1938 | 15,412 | 2,094 | + 13,318 | 24,841 | 5,091 | + 19,750 |
| 1937 | 18,544 | 523 | + 18,021 | 34,811 | 851 | + 33,960 |
| 1936 | 4,932 | 87 | + 4,845 | 32,543 | 2,443 | + 30,100 |
| 1935 | 11,124 | 570 | + 10,554 | 23,609 | 2,760 | + 20,849 |
| Average 1930-34 . . . | 43,864 | 10,533 | + 33,331 | 37,754 | 13,189 | + 24,565 |
| 1934 | 18,184 | 1,572 | + 16,612 | 26,469 | 2,499 | + 23,970 |
| 1933 | 19,363 | 2,197 | + 17,166 | 34,694 | 821 | + 33,873 |
| 1932 | 77,138 | 8,539 | + 68,599 | 28,384 | 2,306 | + 26,078 |
| 1931 | 54,320 | 19,807 | + 34,513 | 67,643 | 15,104 | + 52,539 |
| 1930 | 50,315 | 20,551 | + 29,764 | 31,582 | 45,217 | — 13,635 |
| Average 1925-29 . . . | 26,954 | 38,913 | — 11,959 | 20,285 | 43,964 | — 23,679 |
| 1929 | 36,106 | 22,782 | + 13,324 | 32,428 | 57,098 | — 24,670 |
| 1928 | 39,450 | 26,513 | + 12,937 | 22,545 | 89,547 | — 67,002 |
| 1927 | 33,569 | 31,050 | + 2,519 | 18,144 | 30,507 | — 12,363 |
| 1926 | 15,338 | 47,303 | — 31,965 | 14,109 | 32,731 | — 18,622 |
| 1925 | 10,309 | 66,919 | — 56,610 | 14,197 | 9,938 | + 4,259 |

Although it may not be possible to calculate, on the basis of the incomplete estimates at present available, the volume of the world trade in eggs during the year 1939, it may be supposed that there is no great difference with that of the preceding year.

II. — Countries importing eggs in the shell.

The market sale of eggs in the shell is very limited, owing to the fact that only a few countries are big importers. The most important of these countries is the United Kingdom which during the period 1930-34 imported an average of 362 million lb. The maximum was recorded in 1938 with 458 million lb. Judging by the results for the first eight months of 1939, the imports of the United Kingdom during the whole year 1939 must have been at least equal to those

of 1938. In reality during the first eight months of 1939, the United Kingdom imported 318,940 thousand lb. against 294,080 thousand lb. during the corresponding period of 1938.

VI A). — *World Trade in Eggs in the Shell. — Imports.*

(thousand lb.)

| COUNTRIES | 1939 | 1938 * | 1937 | 1936 | 1935 | Average 1930-1934 |
|---------------------------------|----------------|-------------|---------|---------|---------|----------------------|
| United Kingdom . . . | (1) 318,944 | 458,013 | 409,155 | 406,903 | 326,873 | 362,339 |
| Germany | (2)(4) 120,248 | (3) 201,831 | 198,797 | 155,814 | 142,527 | 267,426 |
| Austria | | 12,382 | 11,266 | 8,195 | 10,064 | 27,385 |
| Switzerland | 29,021 | 31,155 | 31,073 | 30,054 | 30,837 | 33,588 |
| Former Czechoslovakia | — | 6,977 | 14,781 | 14,713 | 13,311 | 14,190 |
| France | (2) 9,494 | 24,841 | 34,811 | 32,543 | 23,609 | 37,754 |
| Italy | (2) 17,382 | 15,412 | 18,544 | 4,932 | 11,124 | 43,864 |
| Greece | 1,426 | 2,914 | 2,500 | 1,463 | 3,450 | 3,663 |
| TOTAL | ... | 753,525 | 720,927 | 654,518 | 561,795 | 790,209 |
| Spain | ... | ... | ... | ... | 73,694 | 63,963 |
| GENERAL TOTAL | ... | ... | ... | ... | 635,489 | 854,172 |

(1) First eight months. — (2) First seven months. — (3) The economic German territory: until September 1938 the former territory of the Reich and, from October 1938 to the end of March 1939 there are also included those regions of German Sudetenland, embodied in the Reich, which adjoin the former German customs territory. The reincorporated regions of German Sudetenland, which are bordering on former Austria, have been as well considered as belonging to Austria. The Austria land and these regions of German Sudetenland have been considered until March 1939 as not belonging to the economic German territory. Now on the other hand trade with those regions is no longer considered as foreign trade since April 1938; respectively October 1938. — (4) The economic German territory: until the end of March 1939, the German territory of the Reich and the regions of German Sudetenland adjoining the German customs territory, as existing until then; since April 1939 is also added the customs territory of former Austria as well as the bordering territories of German Sudetenland and Memel territory. Since the middle of March 1939, trade with the protectorate of Bohemia-Moravia is no longer considered as foreign trade.

The United Kingdom is followed by order of importance by Germany which on the average from 1930 to 1934 imported 267 million lb., with a maximum of 316 million lb. in 1930.

Since 1931 German imports decreased from year to year until 1935 inclusively, when they fell to 142,530 thousand lb. In 1937 imports started again to rise, probably on account of the increased buying power of the masses of industrial workmen. The egg-imports data of Germany (1) for the first seven months of 1939 cannot be compared with that of the previous years. However, on the basis of the exports to this country from Denmark, the Netherlands and the south-eastern countries of Europe in 1939, German imports for the whole period of that year appear to have fluctuated around the level of 1938.

Until 1935, among importing countries Spain occupied the third place, buying noticeable quantities from Turkey, Egypt and Morocco. The statistics published by Spain stop at the first three months of 1936. The imports of

(1) See notes (3) and (4) on Table VI. A).

Spain did not completely cease, even during the Civil War, but the data of export for Spain from exporting countries do not allow to establish their importance during the years from 1936 to 1939.

During 1939 the main egg-suppliers to the Spanish market, such as Turkey, Egypt, Bulgaria and Denmark, started agreements with the Spanish competent organisations in order to resume eggs shipments to that market.

Another large importer is Switzerland, the imports of which do not show strong variations, in spite of a tendency to slight regression. The imports of this country during the twelve months of 1939 were respectively inferior of 6.9 per cent. and 13.6 per cent. to those of 1938 and the average from 1930 to 1934.

The relative importance of each of the importing countries in the world imports (excluding that of Spain) is shown in the following table.

VI B). — *World Trade in Eggs in the Shell. — Imports.*

Relative importance of the principal egg-importing countries.

(Percentages)

| COUNTRIES | 1938 | 1937 | 1936 | 1935 | Average 1930-34 |
|---------------------------------|--------------|--------------|--------------|--------------|--------------------|
| | % | % | % | % | % |
| United Kingdom | 60.8 | 56.7 | 62.1 | 58.2 | 45.8 |
| Germany | 26.8 | 27.6 | 23.8 | 25.3 | 33.8 |
| Austria | 1.7 | 1.6 | 1.3 | 1.8 | 3.5 |
| Switzerland | 4.1 | 4.3 | 4.6 | 5.5 | 4.3 |
| Former Czechoslovakia | 0.9 | 2.1 | 2.2 | 2.4 | 1.8 |
| France | 3.3 | 4.8 | 5.0 | 4.2 | 4.8 |
| Italy | 2.0 | 2.6 | 0.8 | 2.0 | 5.5 |
| Greece | 0.4 | 0.3 | 0.2 | 0.6 | 0.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

The predominant position of the United Kingdom and Germany in the world import is evident. The eggs imports of those two countries represent 79.6 per cent. of the world imports average from 1930 to 1934, and reaches 87.6 per cent. in 1938.

**Distribution of imports of the United Kingdom, Germany,
and Switzerland according to countries of origin.**

The market of the United Kingdom absorbs the surplus of all continents in all periods of the year. All egg-exporting countries have the tendency of creating there a solid position and, such a position once acquired, they defend it at any cost.

The suppliers of the United Kingdom may be divided into two categories:

- (1) British countries.
- (2) Foreign countries.

The share of British countries in the imports of the United Kingdom attained its maximum of 32.7 per cent. in 1933. Since that year it decreased rapidly

VII. — Imports of Eggs in the Shell into the United Kingdom, by countries of origin.

(thousand lb.).

| COUNTRIES OF ORIGIN | First eight months 1939 | | 1938 | | 1937 | | 1936 | | 1935 | | Average 1930-1934 | |
|---|----------------------------|--------------|-----------------------|--------------|-----------------------|--------------------|-----------------------|--------------------|-----------------------|--------------|-----------------------|--------------|
| | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % |
| I. — British Countries. | | | | | | | | | | | | |
| Ireland | 32,904 | 10.3 | 36,679 | 8.0 | 32,230 | 7.9 | 42,382 | 10.4 | 39,600 | 12.1 | 65,927 | 18.2 |
| Union of South Africa and South West Africa | — | — | 4,484 | 1.0 | 4,245 | 1.0 ⁽¹⁾ | 6,147 | 1.5 ⁽¹⁾ | 5,967 | 1.9 | 7,730 | 2.1 |
| Australia | 1,414 | 0.4 | 16,698 | 3.6 | 20,881 | 5.1 | 27,032 | 6.6 | 31,765 | 9.7 | 23,105 | 6.4 |
| Canada | — | — | 2,480 | 0.6 | 2,326 | 0.6 | 1,642 | 0.4 | 1,627 | 0.5 | 1,412 | 0.4 |
| Other British Coun- tries | 903 | 0.3 | 427 | 0.1 | 192 | 0.05 | 643 | 0.2 | 677 | 0.2 | 400 | 0.1 |
| <i>Total from British Countries</i> | <i>35,221</i> | <i>11.0</i> | <i>60,768</i> | <i>13.3</i> | <i>59,874</i> | <i>14.6</i> | <i>77,846</i> | <i>19.1</i> | <i>79,636</i> | <i>24.4</i> | <i>98,574</i> | <i>27.2</i> |
| including: | | | | | | | | | | | | |
| New Zealand | — | — | (385) | (0.1) | (116) | (0.03) | (567) | (0.1) | (619) | (0.2) | (*) (472) | (0.1) |
| II. — Foreign Coun- tries. | | | | | | | | | | | | |
| Denmark | 112,143 | 35.2 | 157,290 | 34.3 | 165,350 | 40.4 | 132,093 | 32.5 | 108,546 | 33.1 | 110,077 | 30.3 |
| Netherlands | 86,840 | 27.2 | 98,098 | 21.4 | 71,271 | 17.4 | 62,827 | 15.4 | 44,297 | 13.6 | 35,948 | 9.9 |
| Belgo-Lux. Ec. Un. | 372 | 0.1 | 1,776 | 0.4 | 7,214 | 1.8 | 8,928 | 2.2 | 4,235 | 1.3 | 21,458 | 5.9 |
| Germany | — | — | — | — | 948 | 0.2 | 656 | 0.2 | 709 | 0.2 | 4,759 | 1.2 |
| Finland | 3,004 | 1.0 | 8,558 | 1.9 | 8,298 | 2.0 | 6,143 | 1.5 | 10,607 | 3.2 | 5,801 | 1.6 |
| Sweden | 7,040 | 2.2 | 8,012 | 1.7 | 5,503 | 1.4 | 3,082 | 0.8 | 4,507 | 1.4 | 5,464 | 1.5 |
| Norway | — | — | 2,692 | 0.6 | 1,963 | 0.5 | 2,500 | 0.6 | 1,333 | 0.4 | 2,442 | 0.7 |
| Lithuania | 7,359 | 2.3 | 7,919 | 1.7 | 7,342 | 1.8 | 7,392 | 1.8 | 2,425 | 0.7 | 933 | 0.3 |
| Estonia | — | — | 2,239 | 0.5 | 793 | 0.2 | 2,286 | 0.6 | 2,882 | 0.9 | 683 | 0.2 |
| Latvia | — | — | — | — | 1,467 | 0.4 | 1,097 | 0.3 | 263 | 0.1 | 326 | 0.1 |
| Poland (and Danzig) | 31,469 | 9.9 | 43,339 | 9.5 | 37,315 | 9.1 | 42,391 | 10.4 | 33,316 | 10.2 | 39,011 | 10.7 |
| Romania | 14,726 | 4.6 | 22,720 | 5.0 | 10,172 | 2.5 | 19,323 | 4.7 | 7,298 | 2.2 | 613 | 0.2 |
| U. S. S. R. | — | — | — | — | — | — | 0 | 0.0 | 257 | 0.1 | 1,970 | 0.5 |
| China | 3,896 | 1.2 | 4,930 | 1.1 | 18,032 | 4.4 | 21,978 | 5.4 | 20,171 | 6.2 | 22,724 | 6.3 |
| Egypt | — | — | 4,064 | 0.9 | 834 | 0.2 | 4,247 | 1.0 | 969 | 0.3 | 3,399 | 0.9 |
| Argentina | — | — | 12,023 | 2.6 | 4,902 | 1.2 | 6,310 | 1.6 | 1,838 | 0.6 | 1,726 | 0.5 |
| Uruguay | — | — | 4,331 | 0.9 | 2,234 | 0.5 | 3,923 | 1.0 | 2,725 | 0.8 | 2,025 | 0.6 |
| Other foreign coun- tries | 16,874 | 5.3 | 19,254 | 4.2 | 5,643 | 1.4 | 3,881 | 0.9 | 859 | 0.3 | 4,906 | 1.4 |
| <i>Total from foreign countries</i> | <i>283,723</i> | <i>89.0</i> | <i>397,245</i> | <i>86.7</i> | <i>349,281</i> | <i>85.4</i> | <i>329,057</i> | <i>80.9</i> | <i>247,237</i> | <i>75.6</i> | <i>263,765</i> | <i>72.8</i> |
| including: | | | | | | | | | | | | |
| France | — | — | — | — | — | — | (15) | (0.0) | (0) | (0.0) | (2,561) | (0.7) |
| Italy | — | — | — | — | — | — | — | — | — | — | (*) (382) | (0.1) |
| United States | — | — | — | — | — | — | — | — | — | — | (*) (1,252) | (0.3) |
| Hungary | — | — | (8,080) | (1.8) | (647) | (0.2) | — | — | (196) | (0.1) | (*) (257) | (0.1) |
| Yugoslavia | — | — | (5,139) | (1.1) | (3,157) | (0.8) | (2,107) | (0.5) | (80) | (0.0) | (*) (376) | (0.1) |
| GENERAL TOTAL . | 318,944 | 100.0 | 458,013 | 100.0 | 409,155 | 100.0 | 406,903 | 100.0 | 326,873 | 100.0 | 362,339 | 100.0 |

(¹) Union of South Africa only. — (²) Average 1932-1934. — (³) Average 1930-1933. — (⁴) Average 1932-1934. — (⁵) Average 1933 and 1934.

falling to 13.3 per cent. in 1938 and to only 11 per cent. during the first eight months of 1939.

The share of foreign countries shows an inverted movement. The main supplying British countries of the United Kingdom are Ireland, Australia and Canada. From the South-African Union only small quantities arrive to the United Kingdom. Owing to her geographical position, Ireland will have been able to increase her shipments of eggs during the first four months of war from September to December 1939.

The principal egg-supplying country of the United Kingdom is Denmark, the quota of which varies from 25.3 per cent. in 1930 to 40.4 per cent. in 1937; during the first eight months of 1939 this proportion was 35.2 per cent. Denmark is followed by the Netherlands, the importance of which on this market has become more considerable during the last years, so that their share in the imports of the United Kingdom rose to 21.4 per cent. in 1938, and to 27.2 per cent. during the first eight months of 1939.

Thus during the last three years more than half of the eggs imports of the United Kingdom came from Denmark and the Netherlands. Based on the situation of 1938 the third place among the supplying countries of the United Kingdom is held by Poland with 9.5 per cent. This percentage rose to 9.9 per cent. during the first months of 1939.

Romania made remarkable progress during the last years and in 1938 she occupied the fifth place, preceded by Denmark, the Netherlands, Poland and Ireland.

Hungary and Yugoslavia became supplying countries of the United Kingdom only during the last years, in consequence of the lack of shipments of eggs from China. In 1938 the global share of Poland, Romania, Hungary and Yugoslavia amounted to 18.1 per cent. of the total imports, exceeding the global share of the British countries (13.3 per cent.).

If war had not broken out, the United Kingdom would have applied the new law for the protection of national poultry-culture, the preparation of which gave occasion to long debates.

The principal ideas forming the basis of the new law were the following:

(1) improvement of animals for breeding, in order to obtain a reduction of cost in eggs and fowl production;

(2) standardization of poultry products in order to increase the consumption of national eggs;

(3) to assure prices equitable and conform to the quality of the product

(4) control for trade and import of eggs.

In Germany as well eggs arrive from all parts of the world.

Up to 1935 inclusively the first and indisputed supplying country of Germany were the Netherlands. In 1936 the share of Denmark in the imports of Germany exceeds for the first time that of the Netherlands. In 1937 the Netherlands occupy again the first place, but only to yield it to Denmark in 1938 and during the first seven months of 1939. The affirmation of Denmark on the German market during the last ten years results from the strong increase of percentage which rose from 4.8 per cent. in 1930 to 24.2 per cent. in 1938,

and to 28.6 per cent. during the first seven months of 1939. In the same period the share of the Netherlands, which in 1930 was of 28.6 per cent., reached its maximum of 44.3 per cent. in 1934, and its minimum of 22.2 per cent. in 1936. On the average during the years from 1930 to 1934 these two countries

VIII. — *Imports of Eggs in the Shell into Germany, by countries of origin.*

(thousand lb.)

| COUNTRIES OF ORIGIN | First seven months 1939 ⁽²⁾ | | 1938 ⁽¹⁾ | | 1937 | | 1936 | | 1935 | | Average 1930-1934 | |
|------------------------|--|--------------|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|-----------------------|--------------|
| | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % | Absol- ute data | % |
| Netherlands | 22,751 | 18.9 | 48,133 | 23.9 | 46,052 | 23.2 | 34,621 | 22.2 | 46,927 | 32.9 | 93,016 | 34.8 |
| Denmark | 34,438 | 28.6 | 48,578 | 24.1 | 43,360 | 21.8 | 40,648 | 26.1 | 32,529 | 22.8 | 28,606 | 10.7 |
| Belgo-Lux. Ec. Un. . . | 3,417 | 2.9 | 14,022 | 7.0 | 11,995 | 6.0 | 12,052 | 7.7 | 6,183 | 4.3 | 18,677 | 7.0 |
| Bulgaria | 4,892 | 4.1 | 23,108 | 11.5 | 28,367 | 14.3 | 27,594 | 17.7 | 19,844 | 13.9 | 27,097 | 10.1 |
| Yugoslavia | 4,321 | 3.6 | 10,354 | 5.1 | 8,917 | 4.5 | 6,036 | 3.9 | 6,998 | 4.9 | 11,668 | 4.4 |
| Hungary | 8,552 | 7.1 | 7,627 | 3.8 | 7,831 | 4.0 | 4,768 | 3.1 | 4,635 | 3.3 | 8,125 | 3.0 |
| Romania | 10,009 | 8.3 | 1,907 | 0.9 | 7,335 | 3.7 | 2,031 | 1.3 | 4,105 | 2.9 | 24,759 | 9.2 |
| Poland and Danzig . . | 1,316 | 1.1 | 8,283 | 4.1 | 4,773 | 2.4 | 3,683 | 2.4 | 120 | 0.1 | 9,572 | 3.6 |
| U. S. S. R. | — | — | — | — | — | — | — | — | 439 | 0.3 | 13,823 | 5.2 |
| Finland | 4,362 | 3.6 | 9,348 | 4.6 | 7,110 | 3.6 | 7,439 | 4.8 | 5,636 | 4.0 | 5,322 | 2.0 |
| Sweden | 2,947 | 2.5 | 4,300 | 2.1 | 4,053 | 2.0 | 2,686 | 1.7 | 2,619 | 1.8 | 3,305 | 1.2 |
| Norway | 760 | 0.6 | 1,081 | 0.5 | 1,065 | 0.5 | 577 | 0.4 | 310 | 0.2 | 534 | 0.2 |
| Estonia | 1,222 | 1.0 | 2,751 | 1.4 | 4,210 | 2.1 | 2,871 | 1.8 | 2,606 | 1.9 | 2,328 | 0.9 |
| Lithuania | 2,756 | 2.3 | 2,766 | 1.4 | 2,121 | 1.1 | 597 | 0.4 | 6 | 0.0 | 3,651 | 1.4 |
| Latvia | 549 | 0.5 | 449 | 0.2 | 1,462 | 0.7 | 220 | 0.1 | 1 | 0.0 | 36 | 0.0 |
| China | 7,252 | 6.0 | 9,252 | 4.6 | 13,108 | 6.6 | 3,169 | 2.0 | — | — | 4,676 | 1.7 |
| Turkey | 1,112 | 0.9 | 1,080 | 0.5 | 834 | 0.4 | 2,205 | 1.4 | 3,563 | 2.5 | 1,486 | 0.6 |
| Egypt | — | — | — | — | — | — | — | — | — | — | 376 | 0.1 |
| Argentina | 2,002 | 1.7 | 1,266 | 0.6 | 1,018 | 0.5 | 238 | 0.2 | 260 | 0.2 | 295 | 0.1 |
| Other countries . . . | 7,590 | 6.3 | 7,526 | 3.7 | 5,186 | 2.6 | 4,379 | 2.8 | 5,746 | 4.0 | 10,074 | 3.8 |
| Total | 120,248 | 100.0 | 201,831 | 100.0 | 198,797 | 100.0 | 155,814 | 100.0 | 142,527 | 100.0 | 267,426 | 100.0 |
| including: | | | | | | | | | | | | |
| Ireland | (6,148) | (5.1) | (6,252) | (3.1) | (4,662) | (2.3) | (4,220) | (2.7) | (4,997) | (3.5) | (6,717) | (2.5) |
| Italy | (767) | (0.6) | (584) | (0.3) | (6) | (0.0) | — | — | (659) | (0.5) | — | — |
| Chile | (234) | (0.2) | (650) | (0.3) | (463) | (0.2) | (19) | (0.0) | — | — | — | — |

(¹) See note (²) on table VI A). — (²) See note (¹) on table VI A).

combined supplied the German market with 45.5 per cent. of the total imports, with 48.1 per cent. in 1938 and 47.5 per cent. during the first seven months of 1939.

These two main suppliers are followed by the Belgo-Luxembourg Economic Union and Ireland, so that the principal supplying centre for eggs to Germany is established by the exporting countries of North-Western Europe, which cover more than 50 per cent. of the German imports.

The third place in German imports is taken by Bulgaria with an average of 10.1 per cent. during the period 1930-34 and of 11.5 per cent. in 1938. Dur-

ing the first seven months of 1939, however, the third place is held by Romania and the fourth place by Hungary.

Taking the four Danubian countries (Romania, Yugoslavia, Hungary and Bulgaria), former Poland and the U. S. S. R. all together, it appears that on the average during the period 1930-34 they supplied 35.5 per cent. After 1934, however, the share of the U. S. S. R. stops completely and that of Romania diminishes notably, so that the group has a relative importance in the German imports of only 25.4 per cent. in 1938 and 24.2 per cent. during the first seven months of 1939. In any case this group of countries represents the second supplying centre of eggs for Germany.

In 1938 the third centre was formed by the Fennoscandian countries (Finland, Norway and Sweden) and the fourth by distant countries, such as China, Argentina and Turkey. With regard to this latter group of countries the affirmation of China on the German market during the last four years is to be stressed.

The last centre for German imports of eggs, by relative importance is formed by the Baltic countries.

The imports from Italy, which on the average during the years from 1930 to 1934 attained 6,717 thousand lb., that is 2.5 per cent. of German imports, after having almost completely stopped in 1936 and 1937, shows a revival in 1938, to further increase notably in 1939.

It is interesting to notice that in the total data of the "other countries" New Zealand figures with 9 thousand lb. in 1938 and with 110 thousand lb. in the first seven months of 1939, and Japan with 135 thousand lb. in the same period of 1939.

As regards Switzerland, the first supplying country during the period 1930-34 was Bulgaria, sharing 32.0 per cent. of the total Swiss imports. For the years 1935 and 1936 this first place was taken by Denmark, but was regained by Bulgaria in 1937. In 1938 it is Yugoslavia that supplies the biggest quantity of eggs and in 1939 again Denmark.

So the first place on the Swiss eggs market is disputed between two Danubian countries, such as Bulgaria and Yugoslavia, and a North-Western European country, namely Denmark.

As for Denmark, it is interesting to notice that she started her exports to Switzerland only in 1932 under the pressure of the difficulties met in selling her eggs on the usual markets.

In the average from 1930 to 1934, the third place by order of importance in the Swiss imports was held by the Belgo-Luxemburg Economic Union and the fourth by Italy.

Italy rapidly and the Belgo-Luxemburg Economic Union more slowly reduced their exports to Switzerland, becoming very modest suppliers in 1939. Always under the pressure of the difficulties met on the English and German markets, former Poland considerably increased her exports to Switzerland, so that she occupied during the year 1937 and 1938 the third place in the imports of this country.

For the same commercial reasons, the Netherlands as well took more and more to the Swiss market, gaining a rather strong position.

IX. — Imports of Eggs in the Shell into Switzerland, by countries of origin.

(thousand lb.)

| COUNTRIES OF ORIGIN | 1939 | | 1938 | | 1937 | | 1936 | | 1935 | | Average 1930-34 | |
|----------------------------|------------------|-------|------------------|-------|------------------|-------|------------------|-------|------------------|-------|--------------------|-------|
| | absolute data | % | absolute data | % | absolute data | % | absolute data | % | absolute data | % | absolute data | % |
| Germany | 67 | 0.2 | 51 | 0.2 | 58 | 0.2 | 115 | 0.4 | 144 | 0.5 | 302 | 0.9 |
| Austria | — | — | 18 | 0.1 | 63 | 0.2 | 134 | 0.4 | 189 | 0.6 | 266 | 0.8 |
| France | 2,871 | 9.9 | 1,956 | 6.3 | 664 | 2.1 | 693 | 2.3 | 687 | 2.2 | 2,119 | 6.3 |
| Italy | 45 | 0.2 | 33 | 0.1 | 25 | 0.1 | 22 | 0.1 | 157 | 0.5 | 3,540 | 10.5 |
| Denmark | 6,602 | 22.7 | 4,118 | 13.2 | 4,452 | 14.3 | 10,216 | 34.0 | 13,031 | 42.2 | 3,296 | 9.8 |
| Netherlands | 1,870 | 6.4 | 1,345 | 4.3 | 2,290 | 7.4 | 1,432 | 4.8 | 1,020 | 3.3 | 700 | 2.1 |
| Belgo Lux. Ec. Un. | 269 | 0.9 | 996 | 3.2 | 2,737 | 8.8 | 1,584 | 5.3 | 973 | 3.2 | 3,756 | 11.2 |
| Bulgaria | 4,894 | 16.8 | 6,280 | 20.1 | 7,811 | 25.1 | 5,094 | 17.0 | 5,176 | 16.8 | 10,734 | 32.0 |
| Jugoslavia | 5,639 | 19.4 | 7,783 | 25.0 | 6,243 | 20.1 | 5,070 | 16.8 | 4,569 | 14.8 | 5,873 | 17.5 |
| Hungary | 773 | 2.7 | 703 | 2.3 | 633 | 2.0 | 795 | 2.6 | 429 | 1.4 | 91 | 0.3 |
| Romania | — | — | 104 | 0.3 | 325 | 1.0 | 675 | 2.2 | 916 | 3.0 | 240 | 0.7 |
| Poland | 3,730 | 12.9 | 5,616 | 18.0 | 4,751 | 15.3 | 2,038 | 6.8 | 2,271 | 7.4 | 2,256 | 6.7 |
| Greece | 0 | 0.0 | — | — | 76 | 0.3 | 104 | 0.3 | 16 | 0.1 | 42 | 0.1 |
| Latvia | 134 | 0.5 | — | — | — | — | 10 | 0.0 | 38 | 0.1 | 8 | 0.0 |
| Lithuania | 888 | 3.1 | 1,195 | 3.8 | 296 | 1.0 | 347 | 1.2 | 351 | 1.1 | 145 | 0.4 |
| Estonia | 402 | 1.4 | 110 | 0.4 | 97 | 0.3 | 333 | 1.1 | 455 | 1.5 | 81 | 0.3 |
| Finland | 587 | 2.0 | 804 | 2.6 | 552 | 1.8 | 1,370 | 4.6 | 415 | 1.3 | — | — |
| China | — | — | — | — | — | — | — | — | — | — | 28 | 0.1 |
| Other countries | 250 | 0.9 | 43 | 0.1 | — | — | 22 | 0.1 | 0 | 0.0 | 111 | 0.3 |
| TOTAL | 29,021 | 100.0 | 31,155 | 100.0 | 31,073 | 100.0 | 30,054 | 100.0 | 30,837 | 100.0 | 33,588 | 100.0 |
| Including: | | | | | | | | | | | | |
| Turkey | (241) | (0.8) | (17) | (0.1) | — | — | (22) | (0.1) | — | — | — | — |
| Sweden | — | — | (12) | (0.0) | — | — | — | — | — | — | — | — |
| United Kingdom | (0) | (0.0) | — | — | — | — | — | — | (0) | (0.0) | — | — |
| Moroc | (9) | (0.0) | (14) | (0.0) | — | — | — | — | — | — | — | — |

France which, favoured by her geographical position, supplies regularly eggs to Switzerland, participated in the total imports of this country, with 6.3 per cent. in 1938 and 9.9 per cent. in 1939.

The three Baltic countries (Lithuania, Estonia and Latvia) and Finland, which on the average during the period 1930-34 contributed scarcely 0.7 per cent. to the Swiss imports, contributed 7.0 per cent. in 1939.

III. — Exports of eggs in the shell during the first three months of 1940.

Estimates are only available for eight exporting countries, which continued publishing their commercial statistics. Among them figure the two principal exporting countries in the world, Denmark and the Netherlands, so that the exports of these 8 countries combined may be considered an indication of world exports.

The most salient fact resulting from the table is that 5 countries out of the 8 (and among them figure the large exporters) diminished their exports as compared with the corresponding period of 1939 and only 3 exporters of less

X. — *Exports of Eggs in the Shell during the first quarter of the years 1931 to 1940.*

(thousand lb.)

| COUNTRIES | January-March 1940 | January-March 1939 | January-March 1938 | January-March 1937 | January-March 1936 | January-March Average 1931/35 | % January-March 1940 | |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------------------|--------------------------------|--|
| | | | | | | | January-March 1939 = 100 | January-March Average 1931/35 = 100 |
| Denmark | 54,880 | 58,761 | 51,906 | 51,119 | 45,240 | 34,579 | 93.4 | 158.7 |
| Netherlands | 54,604 | 57,364 | 49,787 | 41,870 | 34,719 | 40,073 | 95.2 | 136.3 |
| Romania | 3,553 | 8,927 | 2,907 | 4,415 | 7,170 | 3,190 | 39.8 | 111.4 |
| Norway | 835 | 1,345 | 1,704 | 1,260 | 1,081 | 1,235 | 62.1 | 67.6 |
| United States | 1,419 | 1,208 | 1,000 | 899 | 941 | 1,393 | 117.5 | 101.8 |
| China | 6,082 | 7,683 | 6,736 | 9,438 | 5,459 | (1) 6,145 | 79.2 | 99.0 |
| Turkey | 3,025 | 1,708 | 526 | 1,343 | 1,356 | 4,667 | 177.1 | 64.8 |
| Egypt | 4,312 | 1,351 | 2,394 | 2,665 | 4,484 | 8,344 | 319.3 | 51.7 |
| TOTAL . . . | 128,710 | 138,347 | 116,960 | 113,009 | 100,450 | 99,626 | 93.0 | 129.2 |

(1) Average 1932-1935.

importance, such as Turkey, Egypt and the United States, increased them notably. The intensification of the exports of less important exporting countries was not capable of compensating the reduction in the export of the large exporters, so that on the whole a reduction of 7.0 per cent. is noticeable during the first three months of this year, as compared with the figures of the corresponding three months of 1939. However, owing to the great impulse of eggs exports during the last five years among the large exporters, the exports during the first three months of this year exceeds the five years average 1931-35 by 29.2 per cent. Particularly noticeable is the increase recorded by Egypt and Turkey with respect to last year.

The decrease of exports during the first three months of 1940 may be ascribed not only to the always growing difficulties of transport, but equally to the reduction of poultry flocks which was foreseen in autumn 1939 in various egg-exporting countries.

In the following table figure the data which allow to estimate the relative importance of exports during the first three months of the year, as compared with the exports of the whole year. If during the previous years these elements supplied an indication for the development of the export movement during the following nine months, it may not be the same case this year, owing to the perturbations caused by the war in all branches of trade.

XI. — *Relative importance of Exports of Eggs in the Shell during the first quarter (January-March)*

with respect to annual exports into the principal exporting countries.

| COUNTRIES | 1940 | 1939 | | 1938 | | 1937 | | 1936 | | Aver. 1931-1935 | |
|-------------------------|---------------------------------------|---------------------------------------|-------|---------------------------------------|-------|---------------------------------------|-------|---------------------------------------|---------|---------------------------------------|-------|
| | Exports during the quarter Jan.-March | Exports during the quarter Jan.-March | | Exports during the quarter Jan.-March | | Exports during the quarter Jan.-March | | Exports during the quarter Jan.-March | | Exports during the quarter Jan.-March | |
| | absolute data | absolute data | (1) % | absolute data | (1) % | absolute data | (1) % | absolute data | (1) % | absolute data | (1) % |
| | 1,000 lb. | 1,000 lb. | | 1,000 lb. | | 1,000 lb. | | 1,000 lb. | | 1,000 lb. | |
| Denmark | 54,880 | 58,761 | 24.9 | 51,906 | 24.2 | 51,119 | 23.0 | 45,240 | 23.4 | 34,579 | 23.0 |
| Netherlands | 54,604 | 57,364 | 25.6 | 49,787 | 25.6 | 41,870 | 24.9 | 34,719 | 24.3 | 40,073 | 26.0 |
| Romania | 3,553 | 8,927 | 27.9 | 2,907 | 13.5 | 4,415 | 19.3 | 7,170 | 27.1 | 3,190 | 14.1 |
| Norway | 835 | 1,345 | 40.4 | 1,704 | 48.9 | 1,260 | 45.7 | 1,081 | 40.7 | 1,235 | 47.4 |
| United States | 1,419 | 1,208 | 27.1 | 1,000 | 28.9 | 899 | 22.9 | 941 | 27.1 | 1,393 | 27.0 |
| China | 6,082 | 7,683 | 20.1 | 6,736 | 19.8 | 9,438 | 17.0 | 5,459 | 9.9 (*) | 6,145 (*) | 13.4 |
| Turkey | 3,025 | 1,708 | 12.6 | 526 | 8.2 | 1,343 | 20.1 | 1,356 | 10.6 | 4,667 | 12.7 |
| Egypt | 4,312 | 1,351 | 15.1 | 2,394 | 54.4 | 2,665 | 42.5 | 4,484 | 53.5 | 8,344 | 35.5 |
| Total | 128,710 | 138,347 | 24.7 | 116,960 | 24.2 | 113,009 | 23.2 | 100,450 | 22.6 | 99,626 | 23.0 |

(1) Annual exports = 100. — (*) Average 1932/35.

This will not eliminate the interest of knowing the relative importance of exports during the first three months in normal condition, as compared with the whole year in the various countries. The first exporting country in the world, Denmark, generally exports during the first three months a little less than a quarter of the whole year's export (23.0 per cent. average during the period 1931-35), whilst the Netherlands export one quarter.

Romania exported on the average scarcely 14.1 per cent. of the yearly export; this is due to the circumstance that this country produces few eggs in winter. The high percentages in 1936 and 1939 (exceeding 25 per cent.) derive from an exceptionally strong demand. On the average during the period 1931-35 and in the following years, the quota of Norway exceeded in the first three months always 40 per cent. of the global export, which means that this country has a great production of eggs in winter and that it sends abroad a large part of its surplus at a period when prices are generally the highest. The United States on the other hand sent abroad (chiefly to Panama and Mexico) more than a quarter of the entire export of the year during the first three months. The export quota during the first three months is notably weak for Turkey (12.7 per cent. on the average during the period 1931-35) and for China (13.4 per cent.), which reflects the little favourable conditions of production, of collection and eggs transport during the months from December to February in these two countries.

The quota of the first three months of export is especially high in Egypt. This country as a matter of fact sent abroad more than half of her annual surplus (53.5 per cent. on the average during the period 1931-35) from January to March.

For the combined 8 countries under consideration, the quota of the first three months which represents an average of only 23 per cent. of the annual export, was of 24.7 per cent. in 1939. It may therefore be supposed that in the combined 8 countries under consideration, belonging to different parts of the globe and representing a good deal of the world export trade of eggs in the shell, the quota of the first three months amounts more or less to a quarter of the yearly export. This proves that, the maximum and minimum of egg-production in the various countries being distributed over different periods of the year, the world trade succeeds in realizing a nearly uniform distribution of the export during the whole year. Such an uniform distribution of shipments would still be more evident, if the exports of the countries of the southern hemisphere were also taken into consideration.

IV. — Egg prices.

Considering that in the United Kingdom eggs arrive from all parts of the world and at all periods of the year, the value of eggs imported into this country may reflect in general lines the fluctuation of prices from one year to another. It is for this purpose that we calculated the average value in gold francs of 1,000 eggs imported into the United Kingdom. It results from the table that the prices, from a minimum of 48.84 gold francs for 1,000 eggs in 1934, rose slowly but constantly to attain 55.73 gold francs in 1938.

XII. — *Value of 1,000 eggs imported into the United Kingdom.*

| Year | Gold francs |
|-------------------------------------|-------------|
| 1939 (first eight months) | 47.94 |
| 1938 (first eight months) | 52.55 |
| 1937 (first eight months) | 46.33 |
| 1938 | 55.73 |
| 1937 | 53.23 |
| 1936 | 51.61 |
| 1935 | 49.46 |
| <i>Average 1930-1934</i> | 86.50 |
| 1934 | 48.84 |
| 1933 | 56.84 |
| 1932 | 68.61 |
| 1931 | 104.28 |
| 1930 | 129.72 |

As to the year 1939, only estimates referring to the first eight months are available. For comparison we added also the corresponding data during the first eight months of 1937 and 1938. That during the first eight months of 1939

the value of 1,000 imported eggs was inferior [to that of 1938, does not lead to the conclusion that prices during the entire year 1939 remained inferior to those of 1938. As a matter of fact during the months of November and December 1939, egg prices increased more than usual on the various markets, so that they certainly had an influence on the value of eggs imported for the whole year into the United Kingdom. The value of 1,000 eggs imported in 1939 would have been inferior to that of 1938 if war had not broken out. As a consequence of the war, the value of 1,000 imported eggs in 1939 would fluctuate around that of 1938.

In Denmark, the prices of 1939 were in general slightly inferior to those of 1938. This general movement of prices was not even disturbed by the war until November, when in consequence of a rarefaction of eggs on the market,

XIII. — *Egg-prices in Denmark.* ⁽¹⁾

(Couronnes per Kilogramme).

| MONTHS | 1940 | 1939 | 1938 | 1937 |
|---------------------|------|------|------|------|
| January | 1.22 | 1.12 | 1.24 | 0.84 |
| February | 1.30 | 0.88 | 1.14 | 0.89 |
| March | 1.16 | 0.76 | 0.72 | 0.84 |
| April | ... | 0.85 | 0.78 | 0.72 |
| May | ... | 0.94 | 1.00 | 0.73 |
| June | ... | 0.82 | 1.04 | 0.71 |
| July | ... | 0.93 | 1.21 | 1.04 |
| August | ... | 1.20 | 1.25 | 1.14 |
| September | ... | 1.26 | 1.44 | 1.43 |
| October | ... | 1.32 | 1.54 | 1.64 |
| November | ... | 1.90 | 1.46 | 1.64 |
| December | ... | 1.42 | 1.24 | 1.64 |
| Year | ... | 1.12 | 1.17 | 1.10 |

⁽¹⁾ Quotations of the Danish Egg-Export Cooperative (Dansk Andels-Aegksport).

there was a rise in prices from 1.32 Danish crowns per kilogram in October 1939 to 1.90 in November. The quotations of November 1939 were respectively 0.44 and 0.26 crowns per kilogram higher than the quotations of November 1938 and 1937. In December 1939 the price fell again to 1.42 crowns per kilogram. During the first three months of 1940 prices kept on a level generally superior to that of the corresponding period of 1939, 1938 and 1937.

Conclusion.

World trade in eggs in the shell during the year 1939 started with a strong impulse as compared with the year 1938. If war had not broken out, the extension of the trade of this product would have certainly exceeded in 1939 that of 1938, thanks to the improvement of the poultry-farming condition in various exporting countries and to the trade control always more vigorously exercised

by the Government authorities. But in spite of the war an important group of exporting countries intensified their exports in 1939. Considering the countries which during the months from September to December 1939 were not able to export or have exported smaller quantities than during the corresponding period of 1938, it may be said that the volume of trade in eggs in 1939 was about the same as in 1938.

Owing to the fact that in autumn 1939 various exporting countries met with difficulties in procuring the concentrated feed necessary to poultry and consequently had to face a reduction of their flocks, a noticeable decrease in the eggs exports in 1940 may be foreseen, a fact already remarked during the first three months of this year in 8 exporting countries.

V. DESMIREANU.

CURRENT INFORMATION ON LIVESTOCK AND DERIVATIVES.

Switzerland: According to the temporary results of the inquiries effected by the Information Office on prices of the Swiss Union of peasants, 0.4 per cent. of milk less than in June 1939 was delivered this June by the average of 640 dairy societies. The cantons of West Switzerland, St. Gall, Thurgovie, Zurich and Argovie, show a slight increase in comparison with last year. In Central Switzerland no great difference is noticeable in comparison with 1939; delivery was here, on the whole, slightly poorer than last year. In French Switzerland, in return, a decrease of about 4-5 per cent. is recorded.

Argentina: Sanitary conditions of livestock in July were good throughout the country.

CURRENT INFORMATION ON SERICULTURE.

Italy: Silk-producing season was this year exceptionally favourable. According to a recent estimate of the Italian Ministry of Agriculture and Forests, the production of spring cocoons, obligatorily housed at the "Anmassi Collettivi", attained about 76 million lb. against 63 millions in 1939.

The quantity of eggs incubated in spring has been 483,100 ounces against 474,200 ounces in 1939. The unit-production by ounces this year has been very high, having passed from 132.11 lb. per ounce in 1939 to 158.32 lb. per ounce in 1940.

The quantity of eggs incubated for the production of summer and autumn cocoons is estimated this year at 1,500 ounces; this production must be added to that of spring.

TRADE

| COUNTRIES | JUNE | | | | ELEVEN MONTHS (August 1-June 30) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|-----------------|--------|------------------|-------|----------------------------------|-----------|------------------|------------|-------------------------------------|-------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Wheat. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 668 | 3,393 | 0 | 0 | 18,604 | 24,974 | 0 | 0 | 27,571 | 0 |
| Yugoslavia | 221 | 0 | 0 | 0 | 5,337 | 3,167 | 0 | 0 | 3,233 | 0 |
| United States | 379 | 2,357 | 400 | 592 | 12,009 | 44,247 | 5,796 | 5,512 | 46,034 | 6,134 |
| Argentina | 10,192 | 14,325 | — | — | 96,935 | 63,769 | — | — | 70,368 | — |
| Uruguay | ... | ... | ... | ... | (*) 1,392 | (*) 2,154 | (*) 1 | (*) 6 | 2,413 | 8 |
| Iraq | 7 | 22 | 0 | 0 | 1,083 | 606 | 0 | 0 | 621 | 0 |
| Iran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turkey | 345 | 2 | — | — | 1,396 | 1,081 | — | — | 1,098 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 838 | 1,101 | 0 | 0 | 6,429 | 6,754 | 0 | 7,740 |
| Portugal | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 431 | (*) 1,264 | 0 | 1,295 |
| Mexico | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 27 | (*) 368 | 0 | 1,243 |
| Brazil | ... | ... | ... | ... | — | — | (*) 13,086 | (*) 15,219 | — | 23,148 |
| Chile | ... | ... | ... | ... | (*) 1 | (*) 0 | (*) 0 | (*) 483 | 0 | 483 |
| Colombia | ... | ... | ... | ... | — | — | (*) 379 | (*) 200 | — | 556 |
| Peru | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 2,078 | (*) 1,698 | 0 | 2,625 |
| China | 29 | 77 | 606 | 1,627 | 261 | 457 | 3,081 | 7,366 | 511 | 9,597 |
| Wheat Flour. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 2 | 0 |
| Yugoslavia | 86 | 0 | 0 | 0 | 288 | 32 | 0 | 0 | 32 | 0 |
| United States | 502 | 1,196 | 15 | 14 | 11,004 | 12,208 | 121 | 141 | 14,059 | 159 |
| Argentina | 98 | 166 | — | — | 1,829 | 1,881 | — | — | 2,049 | — |
| Uruguay | ... | ... | ... | ... | (*) 237 | (*) 245 | (*) 0 | (*) 0 | 408 | 0 |
| Iraq | 16 | 10 | 0 | 0 | 159 | 140 | — | — | 153 | 0 |
| Turkey | 0 | 4 | — | — | 1 | 73 | — | — | 75 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 2 | 4 | 0 | 0 | 35 | 41 | 0 | 43 |
| Portugal | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 12 | (*) 37 | 0 | 38 |
| Mexico | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 1 | (*) 1 | 0 | 2 |
| Brazil | ... | ... | ... | ... | — | — | (*) 502 | (*) 587 | — | 822 |
| Chile | ... | ... | ... | ... | (*) 2 | (*) 0 | (*) 62 | (*) 63 | 2 | 93 |
| Colombia | ... | ... | ... | ... | — | — | (*) 20 | (*) 12 | — | 30 |
| Peru | ... | ... | ... | ... | (*) 0 | (*) 0 | (*) 29 | (*) 28 | 0 | 42 |
| China | 74 | 213 | 407 | 911 | 837 | 1,030 | 5,063 | 6,597 | 1,176 | 7,108 |
| Iran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Wheat and Flour †. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | NET EXPORTS (*) | | NET IMPORTS (**) | | NET EXPORTS (*) | | NET IMPORTS (**) | | N. EX. (*) | N.IMP. (**) |
| Greece | — | — | 840 | 1,105 | — | — | 6,476 | 6,808 | — | 7,797 |
| Portugal | — | — | — | — | (*) 447 | (*) 1,313 | — | — | — | 1,345 |
| Romania | 670 | 3,393 | — | — | 18,607 | 24,977 | — | — | 27,574 | — |
| Yugoslavia | 336 | 0 | — | — | 5,720 | 3,209 | — | — | 3,276 | — |
| United States | 629 | 3,341 | — | — | 20,723 | 54,825 | — | — | 58,432 | — |
| Mexico | — | — | — | — | — | — | (*) 28 | (*) 369 | — | 1,246 |
| Argentina | 10,322 | 15,546 | — | — | 99,375 | 66,277 | (*) 13,755 | (*) 16,002 | — | 24,244 |
| Brazil | — | — | — | — | — | — | (*) 80 | (*) 567 | — | 604 |
| Chile | — | — | — | — | — | — | (*) 405 | (*) 216 | — | 597 |
| Colombia | — | — | — | — | — | — | (*) 2,116 | (*) 1,735 | — | 2,681 |
| Peru | — | — | — | — | (*) 1,707 | (*) 2,475 | — | — | 2,948 | — |
| Uruguay | ... | ... | 1,021 | 2,480 | — | — | 8,748 | 14,333 | — | 16,996 |
| China | 29 | 36 | — | — | 1,294 | 792 | — | — | 825 | — |
| Iraq | — | — | — | — | — | — | — | — | — | — |
| Iran | — | — | — | — | — | — | — | — | — | — |
| Turkey | 345 | 7 | — | — | 1,398 | 1,179 | — | — | 1,198 | — |
| Rye. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 120 | 187 | 0 | 0 | 2,048 | 549 | 0 | 0 | 640 | 0 |
| United States | 2 | 0 | 0 | 0 | 410 | 374 | 0 | 0 | 374 | 0 |
| Argentina | 170 | 323 | — | — | 5,670 | 1,661 | — | — | 2,085 | — |
| Turkey | 0 | 20 | — | — | 195 | 167 | — | — | 177 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(*) Excess of exports over imports. — (**) Excess of imports over exports.

† Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.333 centals of grain.

‡ Up to May 31. — (†) Up to March 31. — (*) Up to January 31.

| COUNTRIES | JUNE | | | | ELEVEN MONTHS (August 1-June 30) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|---------|--------|---------|------|----------------------------------|---------|---------|---------|---|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Barley. Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 397 | 0 | 0 | 2,329 | 3,713 | 0 | 0 | 4,195 | 0 |
| United States | 17 | 97 | 88 | 119 | 1,570 | 4,977 | 262 | 155 | 5,101 | 237 |
| Argentina | 31 | 353 | — | — | 8,677 | 4,409 | — | — | 4,644 | — |
| Chile | — | — | — | — | (*) 486 | (*) 508 | — | — | 1,076 | — |
| Iraq | 659 | 405 | 0 | 0 | 4,618 | 4,257 | 0 | 0 | 4,573 | 0 |
| Iran | 4 | 13 | 0 | 0 | 135 | 86 | 0 | 0 | 97 | 0 |
| Turkey | 11 | 222 | — | — | 1,010 | 2,402 | — | — | 2,740 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 344 | 0 | 344 |
| Mexico | — | — | — | — | (*) 0 | (*) 0 | (*) 77 | (*) 74 | 0 | 146 |
| Oats. — Thousand centals (1 cental = 100 lb.) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United States | 3 | 3 | 542 | 81 | 62 | 1,110 | 3,269 | 323 | 1,114 | 427 |
| Argentina | 197 | 525 | — | — | 8,306 | 5,613 | — | — | 6,118 | — |
| Chile | — | — | — | — | (*) 662 | (*) 524 | — | — | 1,119 | — |
| Turkey | 0 | 18 | — | — | 6 | 192 | — | — | 231 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 165 | 0 | 0 | 0 |
| Mexico | — | — | — | — | (*) 6 | (*) 0 | (*) 4 | (*) 21 | 0 | 25 |
| Peru | — | — | — | — | — | — | (*) 14 | (*) 15 | — | 26 |
| Maize. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| EIGHT MONTHS (November 1-June 30) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | TWELVE MONTHS (Nov. 1-Oct. 31) | |
| Romania | 1,220 | 1,707 | 0 | 0 | 9,746 | 10,848 | 0 | 0 | 12,014 | 0 |
| Yugoslavia | 2 | 325 | 0 | 0 | 14 | 2,017 | 0 | 0 | 2,334 | 0 |
| United States | 2,302 | 128 | 48 | 54 | 14,607 | 14,768 | 253 | 192 | 19,783 | 253 |
| Dominican Rep. | — | — | — | — | 102 | 157 | — | — | 340 | — |
| Argentina | 3,140 | 11,379 | — | — | 37,736 | 49,332 | — | — | 74,995 | — |
| China | 0 | 0 | — | — | 0 | 26 | — | — | 26 | — |
| Brazil | — | — | — | — | (*) 548 | (*) 933 | — | — | 1,658 | — |
| Iraq | 0 | 0 | — | — | 1 | 2 | — | — | 3 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 8 | 161 | 0 | 0 | 321 | 1,149 | 0 | 1,336 |
| Portugal | — | — | — | — | (*) 0 | (*) 0 | (*) 180 | (*) 530 | 0 | 864 |
| Mexico | — | — | — | — | (*) 0 | (*) 0 | (*) 381 | (*) 113 | 0 | 807 |
| Peru | — | — | — | — | (*) 0 | (*) 0 | (*) 0 | (*) 0 | 0 | 0 |
| Rice. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| SIX MONTHS (January 1-June 30) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| United States | 299 | 242 | 43 | 77 | 1,743 | 1,756 | 216 | 413 | 3,093 | 711 |
| Mexico | — | — | — | — | (*) 0 | (*) 0 | (*) 0 | (*) 0 | 49 | 0 |
| Brazil | — | — | — | — | (*) 235 | (*) 212 | — | — | 1,332 | — |
| Iraq | 2 | 0 | 0 | 0 | 3 | 10 | 0 | 1 | 15 | 1 |
| Thailand | 3,818 | 3,463 | — | — | 17,782 | 21,093 | — | — | 41,010 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 125 | 105 | 0 | 0 | 441 | 398 | 0 | 647 |
| Portugal | — | — | — | — | (*) 0 | (*) 0 | (*) 13 | (*) 14 | 0 | 104 |
| Romania | — | — | 37 | 53 | — | — | 194 | 272 | — | 360 |
| Yugoslavia | 0 | 0 | 5 | 14 | 0 | 0 | 140 | 194 | 0 | 394 |
| Argentina | — | — | — | — | (*) 1 | (*) 1 | (*) 21 | (*) 162 | 2 | 679 |
| Chile | — | — | — | — | — | — | (*) 1 | (*) 131 | — | 187 |
| Colombia | — | — | — | — | — | — | (*) 68 | (*) 35 | — | 490 |
| Peru | — | — | — | — | (*) 0 | (*) 2 | (*) 140 | (*) 133 | 2 | 463 |
| China | 6 | 3 | 986 | 728 | 32 | 143 | 7,434 | 4,849 | 156 | 7,060 |
| Iran | 0 | 0 | 1 | 2 | 1 | 0 | 10 | 9 | 0 | 18 |

(*) Up to May 31. — (†) Up to April 30. — (‡) Up to March 31. — (§) Up to January 31.

| COUNTRIES | JUNE | | | | SIX MONTHS (January 1-June 30) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|-----------|---------|------|---------|------|--------------------------------|------|---------|------|--------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |

Linseed. — Thousand cents (1 cental = 100 lb.).

| | | | | | | | | | | |
|-----------------------------|-----|-------|-----|-------|---------|---------|--------|--------|--------|-------|
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 1 | 0 | 0 | 0 | 2 | 4 | 2 | 3 | 2 |
| Argentina | 636 | 2,243 | — | — | 13,518 | 16,673 | — | — | 26,082 | — |
| Uruguay | — | — | — | — | (*) 650 | (*) 815 | — | — | 2,403 | — |
| China | 4 | 34 | — | — | 4 | 77 | — | — | 99 | — |
| Iraq | 0 | 0 | — | — | 6 | 11 | — | — | 63 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 6 | 0 | 0 | 24 | 28 | 0 | 71 |
| Portugal | — | — | — | — | — | — | (1) 41 | (1) 11 | — | 161 |
| United States | — | — | 292 | 1,009 | — | — | 4,450 | 6,028 | — | 8,976 |

Cotton. — Thousand cents (1 cental = 100 lb.).

ELEVEN MONTHS (August 1-June 30)

TWELVE MONTHS
(August 1-July 31)

| | | | | | | | | | | |
|-----------------------------|-----|-----|-----|-----|-----------|-----------|---------|---------|---------|---------|
| <i>Exporting Countries:</i> | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| United States | 694 | 597 | 62 | 59 | 32,000 | 16,997 | 749 | 670 | 17,562 | 749 |
| Mexico | — | — | — | — | (*) 45 | (*) 178 | (*) 13 | (*) 4 | 308 | 9 |
| Dominican Rep. | — | — | — | — | (*) 1 | (*) 3 | — | — | 5 | — |
| Argentina | 28 | 61 | — | — | 438 | 410 | — | — | 555 | — |
| Brazil | — | — | — | — | (*) 2,545 | (*) 3,684 | — | — | 7,692 | — |
| Peru | — | — | — | — | (*) 1,208 | (*) 1,214 | — | — | 1,801 | — |
| Iraq | 0 | 1 | 0 | 1 | 57 | 52 | 1 | 2 | 53 | 2 |
| Iran | 0 | 34 | 0 | 0 | 294 | 197 | 0 | 0 | 223 | 0 |
| Turkey | 2 | 38 | — | — | 121 | 366 | — | — | 385 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 7 | 6 | 0 | 0 | 72 | 44 | 0 | 49 |
| Portugal | — | — | — | — | — | — | (1) 511 | (1) 423 | — | 474 |
| Romania | 0 | 0 | 24 | 33 | 0 | 0 | 291 | 390 | 0 | 433 |
| Yugoslavia | 0 | 0 | 42 | 32 | 0 | 0 | 444 | 471 | 0 | 515 |
| Colombia | — | — | — | — | — | — | (*) 73 | (*) 51 | — | 127 |
| China | 1 | 14 | 707 | 808 | 85 | 1,292 | 5,063 | 3,096 | 1,305 | 3,698 |

Wool. — Thousand lb.

TEN MONTHS (Sept. 1-June 30)

TWELVE MONTHS
(Sept. 1-Oct. 31)

| | | | | | | | | | | |
|-----------------------------|--------|--------|--------|--------|------------|------------|-----------|-----------|---------|---------|
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Argentina (a) | 12,108 | 22,331 | — | — | 190,511 | 271,289 | — | — | 299,148 | — |
| Argentina (b) | 5,498 | 4,634 | — | — | 65,140 | 47,993 | — | — | 56,738 | — |
| Chile | — | — | — | — | (*) 2,489 | (*) 18,997 | (*) 143 | (*) 368 | 29,701 | 461 |
| Peru | — | — | — | — | (*) 8,272 | (*) 6,325 | — | — | 12,022 | — |
| Uruguay (a) | — | — | — | — | (*) 54,035 | (*) 52,475 | — | — | 95,932 | — |
| Uruguay (b) | — | — | — | — | (*) 16,473 | (*) 13,098 | — | — | 24,306 | — |
| China | 150 | 55 | — | — | 924 | 6,045 | — | — | 6,671 | — |
| Iraq | 2,383 | 1,671 | 24 | 26 | 16,372 | 15,274 | 62 | 42 | 19,672 | 57 |
| Iran | 174 | 785 | 0 | 0 | 10,726 | 4,938 | 0 | 0 | 6,151 | 0 |
| Turkey | 0 | 1,184 | — | — | 5,474 | 15,437 | — | — | 21,272 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 46 | 368 | 628 | 1,133 | 545 | 1,695 | 4,191 | 6,188 | 2,099 | 7,657 |
| Portugal | — | — | — | — | (1) 2,035 | (1) 1,314 | (1) 1,570 | (1) 2,244 | 2,251 | 3,316 |
| Romania | 0 | 22 | 139 | 33 | 0 | 40 | 291 | 734 | 62 | 840 |
| Yugoslavia | 0 | 7 | 620 | 677 | 0 | 276 | 5,758 | 10,060 | 353 | 11,475 |
| United States | 366 | 13 | 18,675 | 14,771 | 478 | 331 | 278,432 | 180,910 | 417 | 209,676 |
| Mexico | — | — | — | — | (*) 0 | (*) 0 | (*) 2,075 | (*) 1,746 | 139 | 4,873 |

Butter. — Thousand lb.

SIX MONTHS (January 1-June 30)

TWELVE MONTHS
(January 1-Dec. 31)

| | | | | | | | | | | |
|-----------------------------|-------|-----|----|-----|--------|--------|--------|--------|--------|-------|
| <i>Exporting Countries:</i> | | | | | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Portugal | — | — | — | — | (1) 46 | (1) 46 | (1) 0 | (1) 0 | 157 | 0 |
| Romania | 0 | 68 | 0 | 0 | 238 | 282 | 0 | 0 | 935 | 0 |
| Argentina | 3,944 | 578 | — | — | 13,944 | 7,860 | — | — | 19,745 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 9 | 106 | — | — | 97 | 593 | — | 1,074 |
| United States | 280 | 187 | 71 | 86 | 1,305 | 957 | 622 | 545 | 2,308 | 1,107 |
| Mexico | — | — | — | — | — | — | (*) 9 | (*) 13 | — | 134 |
| Peru | — | — | — | — | (*) 0 | (*) 0 | (*) 53 | (*) 93 | 0 | 335 |
| China | — | — | 13 | 60 | 214 | — | 214 | 335 | — | 593 |
| Iraq | 0 | 0 | 7 | 4 | 0 | 2 | 22 | 24 | 2 | 40 |
| Iran | 0 | 0 | 18 | 11 | 2 | 2 | 71 | 126 | 4 | 185 |

(a) Unwashed wool. — (b) Washed wool.

(1) Up to May 31. — (*) Up to March 31. — (1) Up to January 31.

| COUNTRIES | JUNE | | | | SIX MONTHS (January 1-June 30) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|---------------------------------------|---------|---------|---------|---------|--------------------------------|--------------------------|-------------------------|-------------------------|-----------------------------------|---------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Cheese. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Portugal. | ... | ... | ... | ... | (¹) 119 | (¹) 101 | (¹) 26 | (¹) 71 | 216 | 201 |
| Romania. | 24 | 2 | 4 | 0 | 157 | 64 | 20 | 31 | 392 | 57 |
| Argentina. | 871 | 381 | — | — | 3,038 | 2,313 | — | — | 5,476 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | 0 | 18 | 324 | 73 | 340 | 42 | 1,338 | 1,874 | 95 | 2,202 |
| United States. | 170 | 123 | 3,364 | 3,781 | 948 | 725 | 20,981 | 25,283 | 1,479 | 59,075 |
| Mexico. | ... | ... | ... | ... | (²) 0 | (²) 4 | (²) 117 | (²) 104 | 7 | 904 |
| Chile. | ... | ... | ... | ... | (²) 2 | (²) 2 | (²) 22 | (²) 29 | 9 | 97 |
| Peru. | ... | ... | ... | ... | (²) 0 | (²) 0 | (²) 82 | (²) 95 | 2 | 721 |
| Iraq. | 0 | 0 | 2 | 2 | 0 | 15 | 22 | 40 | 15 | 60 |
| Iran. | 0 | 0 | 2 | 0 | 0 | 0 | 11 | 0 | 0 | 7 |
| Cacao. — Thousand lb. | | | | | | | | | | |
| NINE MONTHS (Oct. 1-June 30) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Grenada. | ... | ... | — | — | (¹) 4,420 | (¹) 4,407 | — | — | 1938-39 7,388 | 1938-39 7,388 |
| Brazil. | ... | ... | — | — | (²) 113,258 | (²) 171,031 | — | — | 303,320 | — |
| Ecuador. | ... | ... | — | — | (²) 12,092 | (²) 20,358 | — | — | 36,171 | — |
| St. Thomas Prince. | ... | ... | — | — | (¹) 12,877 | (¹) 16,305 | — | — | 23,202 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | 0 | 0 | 93 | 432 | 2 | 0 | 1,219 | 3,320 | 0 | 4,101 |
| Portugal. | ... | ... | ... | ... | (¹) 7 | (¹) 0 | (¹) 999 | (¹) 829 | 2 | 1,215 |
| Romania. | ... | ... | 602 | 121 | — | — | 2,191 | 3,144 | — | 3,783 |
| United States. | ... | ... | 49,926 | 31,652 | — | — | 438,239 | 464,895 | — | 583,184 |
| Mexico. | ... | ... | ... | ... | — | — | (²) 1,984 | (²) 238 | — | 1,345 |
| Argentina. | ... | ... | ... | ... | — | — | (²) 5,979 | (²) 5,282 | — | 10,966 |
| Chile. | ... | ... | ... | ... | — | — | (²) 1,197 | (²) 558 | — | 2,081 |
| Colombia. | ... | ... | ... | ... | — | — | (²) 2,989 | (²) 2,608 | — | 9,244 |
| Uruguay. | ... | ... | ... | ... | — | — | (²) 522 | (²) 648 | — | 1,334 |
| Iran. | ... | ... | 18 | 9 | — | — | 68 | 101 | — | 128 |
| Tea. — Thousand lb. | | | | | | | | | | |
| TWELVE MONTHS (July 1-June 30) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| China. | 4,866 | 1,894 | 1,014 | 1,543 | 84,492 | 83,388 | 18,576 | 7,015 | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | — | — | 15 | 35 | — | — | 238 | 414 | — | — |
| Portugal. | — | — | ... | ... | — | — | (¹) 324 | (¹) 293 | — | 317 |
| Romania. | — | — | 223 | 62 | — | — | 833 | 800 | — | — |
| United States. | — | — | 6,510 | 6,724 | — | — | 100,075 | 89,601 | — | — |
| Mexico. | — | — | ... | ... | — | — | (²) 49 | (²) 42 | — | 84 |
| Argentina. | — | — | ... | ... | — | — | (²) 4,308 | (²) 4,169 | — | 4,802 |
| Chile. | — | — | ... | ... | — | — | (²) 3,417 | (²) 5,168 | — | 6,792 |
| Peru. | — | — | ... | ... | — | — | (²) 922 | (²) 825 | — | 1,074 |
| Uruguay. | — | — | ... | ... | — | — | (²) 377 | (²) 368 | — | 450 |
| Iraq. | 0 | 0 | 483 | 571 | 7 | 71 | 6,748 | 7,300 | — | — |
| Iran. | 0 | 0 | 1,283 | 1,722 | 0 | 0 | 16,874 | 17,785 | — | — |
| Turkey. | — | — | 254 | 187 | — | — | 2,357 | 2,174 | — | — |
| Coffee. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Guatemala. | 4,835 | 5,853 | — | — | 90,496 | 90,196 | — | — | — | — |
| Haiti. | ... | ... | — | — | (¹) 41,641 | (¹) 51,414 | — | — | 64,854 | — |
| Mexico. | ... | ... | — | — | (¹) 52,364 | (¹) 49,077 | — | — | 79,766 | — |
| Nicaragua. | ... | ... | — | — | (¹) 28,065 | (¹) 25,913 | — | — | 40,305 | — |
| Dominican Republic. | ... | ... | — | — | (¹) 14,628 | (¹) 19,138 | — | — | 30,459 | — |
| Salvador. | ... | ... | — | — | (¹) 84,140 | (¹) 107,789 | — | — | 130,792 | — |
| Brazil. | 97,487 | 193,395 | — | — | 1,996,449 | 2,155,720 | — | — | — | — |
| Colombia. | 56,333 | 50,942 | — | — | 494,435 | 537,290 | — | — | — | — |
| Ecuador. | ... | ... | ... | ... | (¹) 28,347 | (¹) 26,628 | — | — | 31,326 | — |
| Peru. | ... | ... | ... | ... | (¹) 5,421 | (¹) 5,340 | (¹) 0 | (¹) 2 | 6,564 | 4 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | — | — | 22 | 1,347 | — | — | 10,730 | 13,018 | — | — |
| Portugal. | — | — | ... | ... | (¹) 3,276 | (¹) 1,647 | (¹) 16,870 | (¹) 12,639 | 1,903 | 13,761 |
| Romania. | — | — | 265 | 597 | — | — | 5,053 | 8,025 | — | — |
| Yugoslavia. | — | — | 743 | 1,248 | — | — | 14,692 | 15,829 | — | — |
| United States. | 906 | 1,010 | 161,802 | 171,930 | 12,256 | 10,598 | 2,043,621 | 1,965,955 | — | — |
| Argentina. | — | — | ... | ... | — | — | (²) 47,774 | (²) 41,939 | — | 50,892 |
| Chile. | — | — | ... | ... | — | — | (²) 8,444 | (²) 5,595 | — | 6,967 |
| Uruguay. | — | — | ... | ... | — | — | (²) 3,821 | (²) 4,059 | — | 5,540 |
| Iraq. | 0 | 0 | 214 | 353 | 0 | 0 | 2,776 | 2,588 | — | — |
| Iran. | 0 | 0 | 196 | 13 | 0 | 0 | 776 | 802 | — | — |
| Turkey. | — | — | 1,089 | 1,305 | — | — | 13,334 | 12,260 | — | — |

(¹) Up to May 31. — (²) Up to April 30. — (³) Up to March 31. — (⁴) Up to the end of February. — (⁵) Up to January 31.

STOCKS**Total wheat in the United States ⁽¹⁾**

| LOCATION | First day of month | | | | |
|--|--------------------|----------------|----------------------|----------------------|-----------------------|
| | July 1940 | April 1940 | July 1939 | July 1938 | July 1937 |
| | thousand cents | | | | |
| On farms | 51,313 | 94,490 | 54,223 | 35,468 | 13,111 |
| In interior mills and elevators | 20,238 | 48,490 | 21,979 | 18,372 | 7,165 |
| Commercial wheat in store | 52,395 | 63,241 | 48,800 ⁴⁾ | 17,000 ⁷⁾ | 9,718 ¹⁰⁾ |
| In merchant mills and elevators ⁽²⁾ | 48,149 | 51,082 | 42,507 ⁵⁾ | 25,492 ⁶⁾ | 27,140 ¹¹⁾ |
| Stored for others in merchant mills ⁽³⁾ | 6,429 | ... | 8,510 ⁸⁾ | 7,037 ⁹⁾ | 4,600 |
| <i>Total U.S. wheat as grain</i> | <i>178,524</i> | <i>257,303</i> | <i>176,019</i> | <i>103,369</i> | <i>61,734</i> |
| Flour (in terms of grain) in merchant mills ⁽⁴⁾ | 12,882 | 12,163 | 11,066 | 10,570 | 11,404 |
| <i>Total U.S. wheat</i> | <i>191,406</i> | <i>269,466</i> | <i>187,085</i> | <i>113,939</i> | <i>73,138</i> |
| Canadian wheat in store in bond in the U. S. | 13,064 | 13,415 | 2,804 | 469 | 3,187 |
| Total wheat in the U. S. | 204,470 | 282,881 | 189,889 | 114,408 | 76,325 |

⁽¹⁾ Incomplete data: wheat in transit is not included, wheat-flour only if in mills. — ⁽²⁾ The figures of the partial quarterly census taken by the Bureau of Census (see next table) have been adjusted to allow for stocks in all mills. — ⁽³⁾ Not including wheat stored for others. — ⁴⁾ Including new wheat 10,339. — ⁵⁾ Including new wheat 6,713. — ⁶⁾ Including new wheat 4,673. — ⁷⁾ Including new wheat 3,686. — ⁸⁾ Including new wheat 4,874. — ⁹⁾ Including new wheat 4,315. — ¹⁰⁾ Including new wheat 7,500. — ¹¹⁾ Including new wheat 7,500.

Wheat and wheat-flour held by commercial mills in the United States ⁽¹⁾.

| LOCATION | Last day of month | | | | |
|---|-------------------|---------------|---------------|---------------|---------------|
| | June 1940 | March 1940 | June 1939 | June 1938 | June 1937 |
| | thousand cents | | | | |
| Wheat stocks, the property of commercial millers: | | | | | |
| Wheat held in mills, and mill-elevators attached to mills | 44,201 | 47,353 | 39,447 | 23,860 | 25,322 |
| Wheat in other elevators ⁽²⁾ | 9,936 | 10,116 | 9,921 | 4,968 | 4,019 |
| Wheat in transit to merchant mills and bought to arrive ⁽³⁾ | 8,075 | 8,684 | 10,463 | 5,393 | 11,384 |
| <i>Total</i> | <i>62,212</i> | <i>66,153</i> | <i>59,831</i> | <i>34,221</i> | <i>40,725</i> |
| Wheat-flour in mills and warehouses, and in transit, sold and unsold | 8,218 | 7,836 | 7,137 | 6,876 | 7,395 |
| Wheat stored for others in mills and mill-elevators and in all other positions | 5,902 | 7,608 | 12,124 | 6,586 | 4,292 |
| Grand total ⁽⁴⁾ | 79,938 | 85,036 | 82,223 | 50,700 | 55,656 |

⁽¹⁾ Partial census by the Bureau of Census, including mills accounting for over 90 % of the total capacity of all commercial mills. — ⁽²⁾ In country elevators, in public terminal elevators and in private terminal elevators not attached to mills. — ⁽³⁾ Of the quantities given under this item only about one-third are actually in transit. — ⁽⁴⁾ Including flour in terms of grain. — ⁽⁵⁾ Not including wheat stored for others outside mills and mill-elevators attached to mills.

Commercial cereals in store in Canada and the United States.

| PRODUCTS AND LOCATION | Friday or Saturday nearest 1st of month ⁽¹⁾ | | | | |
|---|--|----------------|----------------|----------------|---------------|
| | August 1940 | July 1940 | June 1940 | August 1939 | August 1938 |
| | thousand cents | | | | |
| WHEAT : | | | | | |
| Canadian in Canada | ... | 154,279 | 155,363 | 52,856 | 11,236 |
| U.S. in Canada | ... | 383 | 413 | 319 | 197 |
| U.S. in the United States | 96,090 | 52,395 | 58,603 | 93,344 | 57,833 |
| Canadian in the United States | 14,147 | 13,064 | 12,296 | 4,014 | 590 |
| TOTAL | ... | 220,121 | 226,675 | 150,533 | 69,856 |
| RYE : | | | | | |
| Canadian in Canada | ... | 1,042 | 1,102 | 895 | 501 |
| U.S. in Canada | ... | 13 | 13 | 13 | 32 |
| U.S. in the United States | 5,961 | 5,323 | 5,551 | 4,431 | 1,061 |
| Canadian in the United States | 1,739 | 1,562 | 1,527 | 484 | 8 |
| TOTAL | ... | 7,940 | 8,193 | 5,823 | 1,602 |
| BARLEY : | | | | | |
| Canadian in Canada | ... | 2,933 | 3,495 | 2,661 | 1,590 |
| U.S. in Canada | ... | 2 | 0 | 7 | 65 |
| U.S. in the United States | 2,687 | 3,339 | 4,228 | 4,261 | 3,784 |
| Canadian in the United States | 579 | 587 | 666 | 5 | 0 |
| TOTAL | ... | 6,861 | 8,389 | 6,934 | 5,439 |
| OATS : | | | | | |
| Canadian in Canada | ... | 2,160 | 2,531 | 2,707 | 1,028 |
| U.S. in Canada | ... | 21 | 39 | 13 | 249 |
| U.S. in the United States | 886 | 1,002 | 1,478 | 2,017 | 2,188 |
| Canadian in the United States | 31 | 83 | 142 | 29 | 0 |
| TOTAL | ... | 3,266 | 4,190 | 4,766 | 3,465 |
| MAIZE : | | | | | |
| U.S. in Canada | ... | 935 | 934 | 2,258 | 3,041 |
| Argentine in Canada | ... | ... | ... | 2 | 76 |
| South African in Canada | ... | ... | ... | 129 | 158 |
| Australian in Canada | ... | ... | ... | 16 | 0 |
| U.S. in the United States | 14,198 | 14,235 | 13,449 | 11,151 | 8,402 |
| TOTAL | ... | ... | ... | 13,556 | 11,677 |

(1) Friday for Canada, Saturday for the United States. — (2) Datum for May 25.

Cotton stocks on hand in the United States.

| LOCATION | Last day of month | | | | |
|---|-------------------|---------------|---------------|---------------|---------------|
| | July 1940 | June 1940 | May 1940 | July 1939 | July 1938 |
| | thousand cents | | | | |
| In consuming establishments | 4,779 | 5,699 | 6,458 | 4,233 | 6,267 |
| In public storage and at compresses | 44,875 | 47,090 | 49,623 | 57,145 | 47,931 |
| TOTAL | 49,654 | 52,789 | 56,081 | 61,378 | 54,198 |

Carry-over of cotton in the United States.

Total stocks of cotton as on July 31, include, in addition to stocks in consuming establishments, in public storage and at compresses, published monthly, stocks in other positions, namely: cotton for export on shipboard but not cleared; cotton coastwise: cotton in transit to ports, interior towns, and mills; cotton on farms, and in private storage. These stocks in other positions amounted to 2,460,000 cents in 1940 against 2,706,000 cents in 1939, 3,106,000 cents in 1938, 1,954,000 cents in 1937 and 2,808,000 cents in 1936, making total stocks of **52,114,000**, **64,084,000**, **57,304,000**, **21,970,000** and **26,357,000** cents respectively in the five years mentioned.

PRICES**PRICES BY PRODUCTS****A) — Spot quotations ¹⁾**

| DESCRIPTION | August 9, 1940 | August 2, 1940 | July 26, 1940 | July 19, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|---|--------------------------------|--------------------------------|--------------------------------|--|--------------------------------|--------------------------------|--------------------------------|---------------------------------|--------------------------------|
| | | | | | July 1940 | August 1939 | August 1938 | 1939-40 ²⁾ | 1938-39 ³⁾ |
| Wheat | | | | | | | | | |
| Budapest: Tisza wheat, 78 kg. per hl. (pengő per 100 kg.) | 20.75 | 20.75 | 20.75 | 20.75 | 20.75 | 19.73 | 20.18 | 20.43 | 20.42 |
| Braila: Home-grown, good qual. (lei p. ql.) | 680 | n. q. | 600 | 600 | 600 | n. q. | 400 | 521 | 411 |
| Winnipeg: No. 1 Manitoba (cents p. 60 lb.) | ... | ... | 71 ³ / ₄ | 71 ³ / ₄ | 71 ³ / ₄ | 54 ¹ / ₄ | 76 ¹ / ₄ | 76 | 62 |
| Chicago: No. 2 Hard Winter (cents p. 60 lb.) | 76 | 76 ¹ / ₄ | 74 ³ / ₄ | 75 ³ / ₄ | 76 ³ / ₄ | 69 | 66 ³ / ₄ | 92 ³ / ₄ | 70 ³ / ₄ |
| Minneapolis (cents per 60 lb.): | | | | | | | | | |
| No. 1 Northern | 72 ³ / ₄ | 75 ¹ / ₄ | 75 ¹ / ₄ | 76 ³ / ₄ | 77 ¹ / ₄ | 71 ³ / ₄ | 72 ¹ / ₄ | 91 ¹ / ₄ | 74 ³ / ₄ |
| No. 2 Amber Durum | 65 | 67 ³ / ₄ | 67 ³ / ₄ | 68 | 68 ³ / ₄ | 68 ³ / ₄ | 68 ³ / ₄ | 80 ³ / ₄ | 68 ³ / ₄ |
| New York: No. 2 Hard Winter (f.o.b. cents per 60 lb.) | 91 ¹ / ₄ | 94 | 92 ³ / ₄ | 94 ¹ / ₄ | 94 ¹ / ₄ | 88 ³ / ₄ | 82 ³ / ₄ | 112 ¹ / ₄ | 84 ³ / ₄ |
| Buenos Aires (a): No. 2 Hard, 80 kg. per hl. (paper pesos per 100 kg.) . . . | ... | ... | ... | ... | ... | 7.00 | 7.75 | 7.47 | 6.89 |
| Rye. | | | | | | | | | |
| Budapest: Pest rye (pengő p. 100 kg.) . | 16.72 | 16.72 | 16.72 | 16.72 | 16.72 ¹⁾ | 14.20 | 14.81 | 15.62 | 14.34 |
| Winnipeg: No. 2 rye (cents p. 56 lb.) . | ... | ... | 45 ⁷ / ₈ | 45 ⁷ / ₈ | 45 ⁷ / ₈ | 37 | 40 | 62 ¹ / ₄ | 40 ³ / ₄ |
| Minneapolis: No. 2 rye (cents p. 56 lb.) | 41 ¹ / ₄ | 43 ¹ / ₄ | 43 ¹ / ₄ | 44 ¹ / ₄ | 44 ¹ / ₄ | 41 ¹ / ₄ | 41 ¹ / ₄ | 56 ¹ / ₄ | 44 |
| Barley. | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) | ^{a)} 350 | ^{a)} 350 | ^{a)} 360 | n. q. | n. q. | 286 | 291 | ^{a)} 399 | 338 |
| Winnipeg: No. 4 West. (cents p. 48 lb.) ⁽²⁾ | ... | ... | 31 ¹ / ₄ | ^{a)} 31 ¹ / ₄ | ^{a)} 31 | 30 ³ / ₄ | 35 ³ / ₄ | ^{a)} 43 | 34 ¹ / ₄ |
| Chicago: Feeding (on sample; cents p. 48 lb.) | 42 | 40 | 40 | 39 | 39 ¹ / ₄ | 37 ³ / ₄ | 43 ³ / ₄ | 42 ¹ / ₄ | 40 ³ / ₄ |
| Minneapolis: No. 2 Feeding (cents p. 48 lb.) | 41 ¹ / ₄ | 41 ¹ / ₄ | 41 ¹ / ₄ | 41 ¹ / ₄ | 42 ¹ / ₄ | 35 ³ / ₄ | 37 ³ / ₄ | 45 | 40 ³ / ₄ |
| Oats. | | | | | | | | | |
| Winnipeg: No. 2 White (cents per 34 lb.) | ... | ... | 30 ³ / ₄ | 33 ³ / ₄ | 32 ³ / ₄ | 27 | 31 ³ / ₄ | 36 ¹ / ₄ | 29 |
| Chicago: No. 2 White (cents per 32 lb.) | 31 ¹ / ₄ | 32 ¹ / ₄ | 31 | 33 | 33 ³ / ₄ | 31 ³ / ₄ | 26 | 39 | 30 ³ / ₄ |
| Buenos Aires (a): No. 2 White, 49 kg. per hl. (paper pesos p. 100 kg.) . . | ... | ... | ... | ... | ... | 4.14 | 5.89 | 5.19 | 4.81 |
| Milano (b) (lire per 100 kg.): | | | | | | | | | |
| Home-grown | ¹⁰⁾ ... | ¹⁰⁾ ... | ¹⁰⁾ ... | 162.50 | 162.50 | 102.50 | 92.50 | 136.15 | 98.00 |
| Maize. | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) . | 515 | 515 | 515 | 515 | 517 | 410 | 361 | 365 | 362 |
| Chicago: No. 3 Yellow (cents p. 56 lb.) . | 65 ³ / ₄ | 64 ¹ / ₂ | 65 ³ / ₄ | 64 ¹ / ₂ | 64 ³ / ₄ | 44 | 53 ¹ / ₄ | 53 ¹ / ₄ | 51 ¹ / ₄ |
| Buenos Aires (a): Yellow Plata (paper pesos per 100 kg.) | ... | ... | ... | ... | ... | 5.93 | 6.63 | 6.11 | 6.89 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal.
— (a) Thursday prices. — (b) Saturday prices.

⁽¹⁾ In relation to Government price fixing, numerous series are omitted from this table; notes concerning them have been given in various issues of the Crop Report: United Kingdom: Nov. 1939, p. 1066; Italy: Dec. 1939, p. 1163; Germany: Feb. 1940, p. 142, and July 1940, p. 478; — ⁽²⁾ As from Sept. 22, 1939; No. 2 Feeding barley. — ⁽³⁾ Commercial season: August-July; for Maize: May-April. — ⁽⁴⁾ June average: 72. — ⁽⁵⁾ New crop. — ⁽⁶⁾ Price of July 27. — ⁽⁷⁾ Preliminary. — ⁽⁸⁾ Barley No. 3 Western. — ⁽⁹⁾ June average: 31 ¹/₄. — ⁽¹⁰⁾ Oats of new crop must be delivered at collective depots against an advance of lire 120.00 per metric quintal, 42 kg. p. hl. of basic weight, for merchandise of current quality, sound, dried, and marketable; free at collective depot.

| DESCRIPTION | August 9, 1940 | August 2, 1940 | July 26, 1940 | July 19, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|--|----------------------|----------------------|---------------------|---------------------|------------------|----------------|----------------|--------------------|--------------|
| | | | | | July 1940 | August 1939 | August 1938 | 1939 | 1938 |
| Linseed. | | | | | | | | | |
| Buenos Aires (s): Current quality, 4 % impurities (paper pesos p. 100 kg.). | ... | ... | ... | ... | ... | 14.43 | 13.62 | 15.12 | 14.31 |
| London (c.i.f., shipping current or fol- lowing month; £ per long ton): | | | | | | | | | |
| La Plata | n. q. | n. q. | 15-0-0 | 15-0-0 | 15- 0-0 | 13-7-10 | 12- 0-7 | *12- 2-3 | 11-10-11 |
| Bombay | 17-2-6 | 17-2-6 | 17-2-6 | 17-2-6 | 17- 5-0 | 13-1- 3 | 12-10-7 | *14-10-3 | 13- 3-9 |
| Minneapolis: No. 1 Northern (cts. p. 56 lb.). | 149 | 150 | 155 | n. 159½ | 161 ½ | 153 | 172 ½ | 180 | 190 |
| | | | | | | | | 1939-40) | 1938-39) |
| Cotton. | | | | | | | | | |
| New Orleans: Middling (cents p. lb.). | n. 10.10 | n. 10.30 | n. 10.30 | n. 10.50 | *n. 10.46 | n. 8.97 | 8.40 | n. 10.03 | 8.75 |
| New York: Middling (cents per lb.). | n. 10.18 | n. 10.38 | n. 10.43 | *n. 10.49 | *n. 10.47 | n. 9.34 | 8.42 | n. 10.34 | 9.00 |
| Liverpool (pence per lb.): | | | | | | | | | |
| Middling, super good | ... | ... | ... | ... | ... | n. 5.99 | 5.55 | * 8.05 | 5.88 |
| Middling | 7.84 | 7.82 | 7.95 | 7.83 | 7.89 | 5.29 | 4.80 | 7.47 | 5.17 |
| São Paulo, g.f. | ... | ... | ... | ... | ... | 5.08 | 4.90 | 7.44 | 5.14 |
| Broach, good staple, f.g. (†) | n. 6.12 | n. 6.22 | *n. 6.27 | n. 6.17 | *n. 6.21 | n. 4.04 | n. 3.81 | n. 6.36 | *n. 3.92 |
| C.P. Oomra, good staple, superfine (†) | 6.25 | 6.20 | 6.25 | 6.15 | 6.15 | 4.33 | 3.93 | 6.50 | 4.11 |
| Giza 7, f.g.f. | 12.20 | 11.62 | 11.11 | 10.80 | 11.11 | 6.74 | 7.41 | 9.58 | 7.22 |
| Upper Egyptian, f.g.f. | 12.01 | 11.53 | 11.55 | 11.39 | 11.60 | 5.91 | 6.05 | 9.32 | 6.00 |

B) — Quotations for future delivery

| DESCRIPTION | August 9, 1940 | August 2, 1940 | July 26, 1940 | July 19, 1940 | MONTHLY AVERAGES | | | | |
|--|----------------------|----------------------|---------------------|---------------------|------------------|----------------|----------------|----------------|----------------|
| | | | | | July 1940 | August 1939 | August 1938 | August 1937 | August 1936 |
| Wheat. | | | | | | | | | |
| Winnipeg (cents p. 60 lb.): | | | | | | | | | |
| delivery July | — | — | 71 ½ | 71 ½ | 71 ½ | — | — | — | — |
| " October | 73 ½ | 73 ½ | 73 ½ | 73 ½ | 73 ½ | 53 ½ | 68 ½ | 125 ½ | 100 ½ |
| " December | 74 ½ | 74 ½ | 74 ½ | 74 ½ | 74 ½ | 54 ½ | 68 ½ | 122 ½ | 98 ½ |
| Chicago (cents p. 60 lb.): | | | | | | | | | |
| delivery July | — | — | — | 74 ½ | 74 ½ | — | — | — | — |
| " September | 74 ½ | 75 ½ | 74 ½ | 74 ½ | 75 ½ | 65 ½ | 63 ½ | 109 ½ | 110 ½ |
| " December | 75 | 76 | 75 ½ | 76 | 76 ½ | 65 ½ | 65 ½ | 110 ½ | 110 ½ |
| " May | 75 ½ | 76 ½ | 76 ½ | — | — | 66 ½ | 67 ½ | 112 ½ | 109 ½ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery August | n. q. | 8.65 | 9.10 | 9.36 | 9.23 | 7.00 | 7.44 | — | — |
| " September | n. q. | 8.73 | 9.28 | 9.48 | 9.38 | 7.00 | 7.45 | 13.64 | 11.54 |
| " October | n. q. | 8.90 | 9.44 | 9.62 | 9.52 | 7.00 | 7.48 | 13.26 | 11.70 |
| Rye. | | | | | | | | | |
| Winnipeg (cents p. 56 lb.): | | | | | | | | | |
| delivery July | — | — | — | 45 ½ | 45 ½ | 37 ½ | — | — | — |
| " October | 43 ½ | 44 ½ | 46 ½ | 45 ½ | 45 | 38 ½ | 41 | 87 ½ | 66 ½ |
| " December | 44 ½ | 45 ½ | 47 ½ | 46 ½ | 45 ½ | 40 ½ | 41 ½ | 85 ½ | 65 ½ |
| " May | 46 ½ | — | — | — | — | — | 43 ½ | 86 ½ | 65 ½ |
| Chicago (cents p. 56 lb.): | | | | | | | | | |
| delivery July | — | — | — | n. 42 ½ | 42 ½ | — | — | — | — |
| " September | 41 ½ | 42 ½ | 43 ½ | 44 ½ | 44 ½ | 40 ½ | 48 ½ | 80 ½ | 81 |
| " December | 43 ½ | 45 ½ | 46 ½ | 46 ½ | 46 ½ | 42 ½ | 48 ½ | 78 ½ | 80 |
| " May | 47 | 48 ½ | 49 ½ | — | — | 44 ½ | 45 ½ | 79 ½ | 78 ½ |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal. — (a) Thursday prices.

(†) Commercial season: August-July. — (†) As from March 15, 1939: "fair staple". — (†) Quotations of July 25. — (†) June average for the different qualities: respectively, n. 10.60; n. 10.79; 7.50; 6.25; 6.17; 10.81; 10.89.

| DESCRIPTION | August 9, 1940 | August 2, 1940 | July 26, 1940 | July 19, 1940 | MONTHLY AVERAGES | | | | |
|--|--------------------------------|--------------------------------|--------------------------------|------------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | July 1940 | August 1939 | August 1938 | August 1937 | August 1936 | | | | |
| Barley. | | | | | | | | | |
| Winnipeg (cents p. 48 lb.): | | | | | | | | | |
| delivery July | — | — | 34 ³ / ₈ | 35 ¹ / ₈ | 34 ¹ / ₈ | — | — | — | — |
| " October | 34 ¹ / ₈ | 34 ¹ / ₈ | 35 ¹ / ₈ | 36 ¹ / ₈ | 36 | 34 ³ / ₈ | 39 | 57 ⁷ / ₈ | 58 ⁷ / ₈ |
| " December | 33 ¹ / ₈ | 34 ³ / ₈ | 36 ¹ / ₈ | 37 ³ / ₈ | 36 ¹ / ₈ | 33 ¹ / ₈ | 39 ¹ / ₈ | 56 ³ / ₈ | 56 ¹ / ₈ |
| Minneapolis (cents p. 48 lb.): | | | | | | | | | |
| delivery July | — | — | — | n. 33 ¹ / ₈ | 34 | — | — | — | — |
| " September | ... | ... | 35 | 33 ³ / ₈ | 34 ³ / ₈ | 31 | 34 ³ / ₈ | 49 ³ / ₈ | 72 ⁷ / ₈ |
| " December | ... | ... | 37 ¹ / ₈ | 37 | 37 ¹ / ₈ | 32 ¹ / ₈ | 34 | 48 | 69 ¹ / ₈ |
| Oats. | | | | | | | | | |
| Winnipeg (cents p. 34 lb.): | | | | | | | | | |
| delivery July | — | — | 30 ¹ / ₈ | 33 ¹ / ₈ | 32 ¹ / ₈ | — | — | — | — |
| " October | 29 ³ / ₈ | 29 ¹ / ₈ | 29 | 29 ¹ / ₈ | 28 ⁷ / ₈ | 27 ⁷ / ₈ | 31 ¹ / ₈ | 47 ¹ / ₈ | 47 |
| " December | 27 ³ / ₈ | 27 ³ / ₈ | 27 ³ / ₈ | 27 ¹ / ₈ | 27 ¹ / ₈ | 27 ¹ / ₈ | 39 ³ / ₈ | 44 ³ / ₈ | 44 ⁷ / ₈ |
| " May | 28 ⁷ / ₈ | — | — | — | — | 28 ³ / ₈ | — | 44 ³ / ₈ | 45 ¹ / ₈ |
| Chicago (cents p. 32 lb.): | | | | | | | | | |
| delivery July | — | — | — | 31 ¹ / ₈ | 31 | — | — | — | — |
| " September | 29 ¹ / ₈ | 29 ¹ / ₈ | 29 | 28 ³ / ₈ | 28 ³ / ₈ | 28 ³ / ₈ | 23 ¹ / ₈ | 29 ³ / ₈ | 42 ¹ / ₈ |
| " December | 29 ³ / ₈ | 29 ¹ / ₈ | 30 | 29 ³ / ₈ | 29 ³ / ₈ | 28 ¹ / ₈ | 24 | 29 ¹ / ₈ | 43 ³ / ₈ |
| " May | 30 ¹ / ₈ | 30 ¹ / ₈ | 31 ³ / ₈ | — | — | 28 ⁷ / ₈ | 25 ³ / ₈ | 31 ¹ / ₈ | 44 ¹ / ₈ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery August | 5.05 | 5.05 | 5.05 | 5.05 | 5.05 * | 4.13 | 5.84 | — | — |
| Maize. | | | | | | | | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | |
| delivery July | — | — | — | 63 | 62 | — | — | — | — |
| " September | 61 ¹ / ₈ | 60 ³ / ₈ | 61 ³ / ₈ | 60 ³ / ₈ | 59 ³ / ₈ | 43 | 52 ³ / ₈ | 97 | 107 ⁷ / ₈ |
| " December | 56 ¹ / ₈ | 56 ³ / ₈ | 58 ³ / ₈ | 56 ⁷ / ₈ | 56 ¹ / ₈ | 42 ³ / ₈ | 49 ³ / ₈ | 65 ¹ / ₈ | 94 ¹ / ₈ |
| " May | 58 ¹ / ₈ | 59 ¹ / ₈ | 60 ³ / ₈ | — | — | 45 ³ / ₈ | 52 ¹ / ₈ | 66 ¹ / ₈ | 90 ³ / ₈ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery August | — | — | 4.35 | 4.54 | 4.44 * | 5.90 | 6.74 | — | — |
| " September | 4.40 | 4.28 | 4.43 | 4.56 | 4.52 | 5.99 | 6.76 | 6.50 | 6.14 |
| " October | 4.49 | 4.34 | 4.46 | 4.67 | 4.57 | 6.03 | 6.78 | 6.53 | 6.23 |
| Linseed. | | | | | | | | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery August | 15.45 | 15.45 | 15.45 | 15.45 | 15.45 * | 14.42 | 13.72 | — | — |
| " September | 15.45 | 15.45 | 15.45 | 15.45 | 15.45 | 14.51 | 13.65 | 15.89 | 15.65 |
| " October | 15.45 | 15.45 | 15.45 | 15.45 | 15.45 | 14.50 | 13.55 | 15.84 | 15.79 |
| Duluth (cents p. 56 lb.): | | | | | | | | | |
| delivery July | — | — | — | n. 156 | 159 | — | — | — | — |
| " September | ... | ... | n. 154 | n. 155 ¹ / ₈ | 158 | 150 ¹ / ₈ | 170 ¹ / ₈ | 198 ³ / ₈ | 210 ¹ / ₈ |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER

| DESCRIPTION | June | May | April | March | Feb. | Jan. | June | June | YEAR | |
|--|----------------------|-------|-------|-------|-------|-------|-------|-------|-----------------------------|--------------------------------|
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | 1939-40 (¹) | 1938-39 (¹) |
| Germany | | | | | | | | | | |
| (Statistisches Reichsamt; products sold by farmers) | | | | | | | | | | |
| Average for corresponding months 1909-10/1913-14 = 100. | | | | | | | | | | |
| Cereals | 110 | 109 | 111 | 112 | 111 | 112 | 109 | 104 | 110 | 111 |
| Edible potatoes | 115 | 120 | 116 | 114 | 106 | 110 | 112 | 112 | 116 | 116 |
| Plant products | 111 | 112 | 112 | 112 | 110 | 110 | 110 | 105 | 112 | 112 |
| Meat animals | 102 | 102 | 100 | 99 | 99 | 98 | 100 | 98 | 98 | 97 |
| Livestock products (butter and eggs) | 142 | 137 | 130 | 116 | 107 | 109 | 126 | 123 | 117 | 111 |
| Livestock and livestock products | 115 | 113 | 109 | 104 | 102 | 101 | 108 | 106 | 104 | 101 |
| Total agricultural products | ¹) 115 | 113 | 110 | 106 | 104 | 104 | 109 | 106 | 106 | 104 |
| Germany | | | | | | | | | | |
| (Statistisches Reichsamt; wholesale products) | | | | | | | | | | |
| 1913 = 100. | | | | | | | | | | |
| Agricultural products | ⁴) 112.3 | 111.7 | 111.2 | 110.1 | 108.1 | 108.2 | 108.7 | 106.0 | 107.9 | 105.9 |
| Fertilizers | 49.6 | 54.2 | 55.3 | 55.3 | 55.3 | 54.5 | 55.0 | 55.6 | 54.6 | 55.3 |
| Consumption goods (⁵) | 141.8 | 139.3 | 138.9 | 138.5 | 138.1 | 137.5 | 135.6 | 135.6 | 135.9 | 135.4 |
| Wholesale products in general | ⁷) 110.4 | 109.9 | 109.6 | 109.4 | 108.4 | 108.2 | 106.8 | 105.6 | 106.9 | 105.7 |
| England and Wales (⁶) | | | | | | | | | | |
| (Ministry of Agriculture and Fisheries) | | | | | | | | | | |
| Average 1927-1929 = 100. | | | | | | | | | | |
| A: UNCORRECTED FOR SEASONAL VARIATION | | | | | | | | | | |
| Cereals and farm crops | ... | ... | ... | ... | ... | ... | 75 | 104 | 86 | 86 ¹ / ₂ |
| Livestock and livestock products | ... | ... | ... | ... | ... | ... | 81 | 80 | 93 | 88 |
| Total agricultural products | ... | ... | ... | ... | ... | ... | 80 | 83 | 92 | 90 |
| Wholesale products in general (⁸) | ... | ... | 113.7 | 110.9 | 110.1 | 107.6 | 84.1 | 86.3 | 88.3 | 86.9 |
| B: CORRECTED FOR SEASONAL VARIATION | | | | | | | | | | |
| Cereals and farm crops | ... | ... | ... | ... | ... | ... | 74 | 104 | — | — |
| Livestock and livestock products | ... | ... | ... | ... | ... | ... | 91 | 90 | — | — |
| Total agricultural products | ... | ... | ... | ... | ... | ... | 88 | 92 | — | — |
| Argentina | | | | | | | | | | |
| (Banco Central de la República Argentina) | | | | | | | | | | |
| 1926 = 100. | | | | | | | | | | |
| Cereals and linseed | 69.9 | 73.4 | 79.0 | 75.2 | 73.1 | 82.3 | 76.6 | 88.8 | 77.6 | 90.6 |
| Meat | 107.2 | 108.1 | 106.4 | 103.1 | 103.8 | 103.7 | 92.3 | 99.5 | 94.5 | 94.8 |
| Hides and skins | 77.3 | 90.3 | 103.4 | 111.8 | 111.7 | 111.3 | 77.5 | 68.7 | 89.2 | 81.9 |
| Wool | 108.7 | 129.4 | 141.7 | 146.7 | 152.5 | 141.9 | 93.2 | 90.5 | 103.9 | 92.5 |
| Dairy products | 88.3 | 81.5 | 74.3 | 77.2 | 76.8 | 75.7 | 87.1 | 84.5 | 83.0 | 83.9 |
| Forest products | 111.2 | 110.7 | 113.4 | 116.1 | 116.1 | 116.6 | 101.6 | 99.9 | 104.2 | 100.0 |
| Total agricultural products | ⁹) 79.5 | 84.6 | 90.1 | 88.4 | 87.3 | 91.9 | 80.9 | 88.8 | 83.6 | 90.6 |
| Non agricultural commodities | 135.9 | 134.7 | 132.7 | 133.6 | 133.0 | 134.1 | 109.4 | 108.3 | 114.8 | 109.4 |
| Wholesale products in general | ⁹) 123.8 | 124.1 | 123.7 | 124.0 | 123.3 | 123.9 | 103.4 | 104.2 | 108.2 | 105.5 |

(¹) Household goods of all kinds, and clothing. — (²) Index-numbers taking account of payments under the Wheat Act, the Cattle Subsidy Act, and Government payments for milk. — (³) Index-numbers by the Board of Trade reduced to 1927-1929 = 100. — (⁴) Agricultural year: July 1-June 30. — (⁵) July: 113. — (⁶) July: 112.3. — (⁷) July: 110.7. — (⁸) July: 79.6. — (⁹) July: 124.4.

| DESCRIPTION | June | May | April | March | Feb. | Jan. | June | June | YEAR | |
|---|--------------------|------|-------|-------|-------|-------|-------------------|-------------------|-------|-------|
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | 1939 | 1938 |
| | | | | | | | | | | |
| Chile | | | | | | | | | | |
| (Dirección General de Estadística) | | | | | | | | | | |
| 1913 = 100 | | | | | | | | | | |
| Cereals | ... | ... | 465.1 | 457.4 | 449.2 | 445.5 | 439.5 | 544.2 | 441.1 | 551.0 |
| Other plant products | ... | ... | 465.4 | 449.0 | 443.6 | 432.9 | 426.2 | 394.1 | 396.9 | 375.4 |
| Meat animals | ... | ... | 372.9 | 391.2 | 390.4 | 386.8 | 344.0 | 381.8 | 366.1 | 380.3 |
| Meat | ... | ... | 336.4 | 359.8 | 346.7 | 351.5 | 280.6 | 317.5 | 303.4 | 324.7 |
| Total agricultural products | ... | ... | 443.6 | 437.1 | 430.6 | 424.2 | 425.9 | 431.0 | 400.7 | 424.3 |
| Domestic industrial products | ... | ... | 476.7 | 469.1 | 452.9 | 446.8 | 433.1 | 471.7 | 433.6 | 472.5 |
| Wholesale products in general | ... | ... | 543.9 | 539.7 | 532.4 | 526.3 | 500.2 | 514.0 | 496.7 | 510.7 |
| United States | | | | | | | | | | |
| (Bureau of Agricultural Economics) | | | | | | | | | | |
| Average 1909-10 to 1913 14 = 100. | | | | | | | | | | |
| A: UNCORRECTED | | | | | | | | | | |
| FOR SEASONAL VARIATION | | | | | | | | | | |
| Cereals | 83 | 92 | 96 | 92 | 91 | 90 | 73 | 77 | 72 | 74 |
| Cotton and cottonseed | 81 | 83 | 85 | 85 | 85 | 85 | 73 | 68 | 73 | 70 |
| Fruits | 104 | 88 | 81 | 73 | 76 | 66 | 93 | 73 | 77 | 73 |
| Meat animals | 102 | 108 | 104 | 102 | 101 | 103 | 107 | 116 | 110 | 114 |
| Dairy products | 104 | 106 | 110 | 114 | 118 | 119 | 94 | 98 | 104 | 109 |
| Chickens and eggs | 81 | 84 | 82 | 83 | 98 | 91 | 83 | 99 | 94 | 108 |
| Miscellaneous | 100 | 101 | 100 | 101 | 107 | 113 | 81 | 84 | 93 | 98 |
| Total agricultural products | ^{a)} 95 | 98 | 98 | 97 | 101 | 99 | 89 | 92 | 92 | 95 |
| Commodities bought for use in living and production | 123 | 123 | 123 | 122 | 122 | 122 | 120 | 124 | 121 | 122 |
| Prices, interest and taxes paid by farmers | 128 | 128 | 128 | 128 | 128 | 128 | 126 | 129 | 127 | 127 |
| Agricultural wages (¹) | 129 | — | 124 | — | — | 119 | ^{a)} 126 | ^{a)} 129 | 122 | 124 |
| B: CORRECTED | | | | | | | | | | |
| FOR SEASONAL VARIATION | | | | | | | | | | |
| Cereals | 79 | 90 | 94 | 90 | 90 | 91 | 70 | 74 | — | — |
| Cotton and cottonseed | 79 | 81 | 85 | 86 | 87 | 88 | 71 | 66 | — | — |
| Fruits | 87 | 77 | 78 | 73 | 82 | 72 | 78 | 62 | — | — |
| Truck crops (market garden crops) | 134 | 133 | 145 | 128 | 168 | 117 | 105 | 92 | — | — |
| Meat animals | 101 | 106 | 101 | 99 | 102 | 107 | 105 | 115 | — | — |
| Dairy products | 108 | 109 | 110 | 111 | 114 | 114 | 98 | 103 | — | — |
| Chickens and eggs | 96 | 100 | 100 | 101 | 97 | 80 | 98 | 119 | — | — |
| Miscellaneous | 96 | 98 | 100 | 107 | 114 | 114 | 79 | 81 | — | — |
| Total agricultural products | ^{a)} 95 | 98 | 99 | 98 | 102 | 100 | 88 | 92 | — | — |
| Agricultural wages (¹) | 125 | — | 127 | — | — | 124 | ^{a)} 122 | ^{a)} 125 | — | — |
| United States | | | | | | | | | | |
| (Bureau of Labor) | | | | | | | | | | |
| 1926 = 100. | | | | | | | | | | |
| Grains | 64.4 | 71.2 | 77.2 | 73.4 | 72.8 | 73.5 | 58.2 | 62.7 | 58.7 | 60.6 |
| Livestock and poultry | 64.7 | 69.6 | 68.4 | 67.1 | 65.6 | 67.2 | 69.4 | 80.2 | 72.2 | 79.0 |
| Other farm products | 67.0 | 65.5 | 67.4 | 66.3 | 68.9 | 68.6 | 58.8 | 63.0 | 62.6 | 63.9 |
| Total agricultural products | ^{a)} 66.2 | 67.9 | 69.4 | 67.9 | 68.7 | 69.1 | 62.4 | 68.7 | 65.4 | 68.5 |
| Agricultural implements | 92.5 | 92.5 | 93.5 | 93.4 | 93.4 | 93.4 | 93.4 | 96.1 | 93.4 | 95.5 |
| Fertilizer materials | 67.4 | 70.8 | 70.7 | 70.6 | 71.0 | 71.3 | 69.5 | 69.5 | 70.0 | 69.2 |
| Mixed fertilizers | 72.8 | 73.0 | 73.8 | 73.9 | 74.2 | 73.9 | 71.7 | 69.3 | 73.0 | 72.2 |
| Cattle feed | 80.0 | 93.3 | 100.1 | 95.2 | 93.7 | 93.0 | 81.5 | 78.4 | 82.0 | 76.9 |
| Non-agricultural commodities | 79.8 | 80.5 | 80.5 | 80.5 | 80.8 | 81.5 | 78.4 | 80.3 | 79.6 | 80.6 |
| Wholesale products in general | ^{a)} 77.5 | 78.4 | 78.6 | 78.4 | 78.7 | 79.4 | 75.6 | 78.3 | 77.2 | 78.6 |

(¹) 1920-1914 = 100. — (²) July: 95. — (³) July: 66.5. — (⁴) July: 77.7. — (⁵) July 1939 and 1938 respectively.

| Description | June | May | April | March | Feb. | Jan. | June | June | YEAR | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | 1939 | 1938 |
| Hungary | | | | | | | | | | |
| (Central Royal Bureau of Statistics) | | | | | | | | | | |
| 1929 = 100. | | | | | | | | | | |
| Cereals | 91.7 | 91.7 | 91.5 | 91.2 | 89.7 | 88.9 | 83.8 | 93.9 | 85.9 | 89.1 |
| Total raw plant products ⁽¹⁾ | 96.4 | 93.2 | 92.5 | 92.1 | 91.0 | 88.8 | 77.7 | 80.9 | 79.5 | 76.9 |
| Meat animals, meat and lard | 86.2 | 86.7 | 79.1 | 76.3 | 75.2 | 69.0 | 64.8 | 60.6 | 65.1 | 68.4 |
| Total livestock products ⁽¹⁾ | 83.1 | 83.9 | 77.9 | 76.2 | 75.9 | 71.5 | 63.8 | 59.8 | 65.6 | 65.6 |
| Total agricultural products ⁽¹⁾ | 92.2 | 90.3 | 87.9 | 87.1 | 86.3 | 83.4 | 73.3 | 74.3 | 75.2 | 73.4 |
| Products of agricultural industries | 99.0 | 98.9 | 96.5 | 96.3 | 95.8 | 96.6 | 92.4 | 109.6 | 93.9 | 103.0 |
| Industrial raw materials and products | 103.1 | 102.2 | 98.1 | 97.4 | 97.0 | 96.5 | 92.2 | 93.0 | 93.1 | 93.3 |
| Wholesale products in general ⁽¹⁾ | 98.7 | 97.5 | 94.3 | 93.6 | 93.0 | 91.7 | 84.9 | 87.7 | 86.3 | 86.8 |
| Ireland | | | | | | | | | | |
| Department of Industry and Commerce) | | | | | | | | | | |
| Average 1911-1913 = 100. | | | | | | | | | | |
| Agricultural products in general | ... | ... | 145.3 | 145.4 | 141.2 | 133.6 | 114.8 | 114.3 | 120.7 | 111.9 |
| Norway | | | | | | | | | | |
| (Kgl. Selskap for Norges Vel) | | | | | | | | | | |
| Average 1909-1914 = 100. | | | | | | | | | | |
| Cereals | 175 | 175 | 175 | 175 | 175 | 173 | 163 | 172 | 168 | 168 |
| Potatoes | 369 | 399 | 379 | 297 | 236 | 212 | 125 | 297 | 186 | 174 |
| Pork | 163 | 170 | 140 | 144 | 151 | 160 | 121 | 121 | 141 | 127 |
| Other meat | 196 | 211 | 168 | 174 | 170 | 167 | 159 | 188 | 168 | 179 |
| Dairy products | 198 | 198 | 198 | 198 | 198 | 193 | 179 | 175 | 186 | 176 |
| Eggs | 147 | 147 | 130 | 164 | 126 | 107 | 103 | 113 | 129 | 124 |
| Concentrated feedingstuffs | 199 | 199 | 180 | 177 | 178 | 174 | 157 | 161 | 163 | 158 |
| Maize | 188 | 188 | 182 | 179 | 179 | 175 | 157 | 162 | 165 | 158 |
| Fertilizers | 124 | 124 | 124 | 121 | 111 | 113 | 94 | 103 | 101 | 98 |
| Switzerland | | | | | | | | | | |
| (Schweizerischer Bauernverband) | | | | | | | | | | |
| 1914 = 100. | | | | | | | | | | |
| Slaughter cattle | ... | ... | 131 | 125 | 121 | 124 | 121 | 126 | 118 | 117 |
| Slaughter pigs | ... | ... | 139 | 140 | 140 | 141 | 117 | 117 | 128 | 125 |
| Milk (base price) | 135 | 135 | 135 | 129 | 129 | 123 | 117 | 123 | 121 | 120 |
| Total agricultural products ⁽¹⁾ | 138 | 138 | 137 | 133 | 131 | 130 | 118 | 121 | 122 | 126 |
| Feedingstuffs ⁽²⁾ | 137 | 132 | 132 | 132 | 131 | 129 | 104 | 109 | 113 | 105 |
| Fertilizers ⁽³⁾ | 112 | 107 | 105 | 105 | 102 | 100 | 97 | 94 | 101 | 96 |
| Wholesale products in general ⁽⁴⁾ ⁽¹⁾ | 138.7 | 134.9 | 134.2 | 132.1 | 129.7 | 127.7 | 106.4 | 107.1 | 111.2 | 107.1 |
| Yugoslavia | | | | | | | | | | |
| (National Bank of the Kingdom of Yugoslavia) | | | | | | | | | | |
| 1926 = 100. | | | | | | | | | | |
| Plant products | ... | 107.7 | 106.3 | 101.4 | 97.0 | 91.7 | 81.2 | 88.7 | 82.5 | 85.8 |
| Livestock products | ... | 89.7 | 89.6 | 89.0 | 83.6 | 85.3 | 68.1 | 64.2 | 68.7 | 65.8 |
| Industrial products | ... | 103.8 | 104.2 | 99.5 | 96.5 | 95.5 | 77.2 | 80.3 | 79.8 | 78.2 |
| Wholesale products in general | ... | 102.8 | 102.4 | 98.5 | 94.9 | 93.3 | 77.7 | 79.4 | 79.3 | 78.3 |

⁽¹⁾ Including unspecified products. — ⁽²⁾ Agricultural year April 1-March 31. — ⁽³⁾ Index numbers calculated by the Bundesamt für Industrie, Gewerbe und Arbeit; base July 1914. — ⁽⁴⁾ July: 99.4. — ⁽⁵⁾ July: 101.9. — ⁽⁶⁾ July: 139. — ⁽⁷⁾ July: 140.6.

LATEST INFORMATION

Egypt: During the latter half of July weather conditions were favourable to the development and maturation of the cotton bolls, which by the end of the month were fully opened in Upper Egypt, while opening was progressing in southern Delta. In some parts where irrigation was irregular and water inadequate, owing to the Nile flood being late this year, many bolls opened abnormally, but their proportion is not large. Water has been inadequate in many places, especially in those lying along the last part of the canals. Cotton worm and its egg-masses have been destroyed very actively, but in the north and north-west of the Delta some amount of damage was reported. Crop condition at the beginning of August was normal.

The area cultivated to cotton this year amounts to 1,749,000 acres, against 1,687,000 acres in 1939 and 1,843,000 acres the five-year average 1934-38; percentages: 103.7 and 94.9. In comparison with last year, cotton acreage has increased mostly in the Delta and in Upper Egypt; in Middle Egypt the increase is very limited. Giza 7 and Giza 12, now called Wafir, are both in regression, while all other varieties, including Sakel, have been sown on larger areas than last year.

The British Government have agreed with the Egyptian Government to buy all the cotton produced in Egypt from the 1940 crop, at prices fixed in the agreement itself. For technical reasons consequent to this agreement, the ginning of the new crop will start only at September 15, which means a fortnight later than normally.

The area of each cotton variety cultivated in 1940, in comparison with the corresponding figures of the six preceding years, is as follows:

| VARIETIES | 1940 | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 |
|---------------------------------|------------------|-------|-------|-------|-------|-------|-------|
| | (thousand acres) | | | | | | |
| Long staple, above 1 1/8" | | | | | | | |
| Maarad | 86 | 83 | 106 | 84 | 74 | 85 | 57 |
| Sakha 4 | 27 | 19 | 17 | 43 | 43 | 28 | 10 |
| Sakellaridis | 91 | 72 | 144 | 167 | 168 | 309 | 436 |
| Malaki (Giza 26) | 32 | 14 | 9 | 2 | — | — | — |
| Karnak (Giza 29) | 7 | 1 | — | — | — | — | — |
| Giza 7 | 538 | 625 | 595 | 539 | 423 | 280 | 297 |
| Long-medium staple above 1 1/8" | | | | | | | |
| Wafir (Giza 12) | 42 | 67 | 41 | 17 | 6 | — | — |
| Fuadi | — | — | 10 | 12 | 20 | 33 | 41 |
| Giza 3 | — | — | 2 | 3 | 9 | 11 | 10 |
| Other varieties | 1 | 1 | — | — | 2 | 13 | 28 |
| Medium staple, above 1 1/8" | | | | | | | |
| Zagora | 352 | 272 | 354 | 1,186 | 1,036 | 974 | 919 |
| Ashmuni | 573 | 534 | 574 | | | | |
| Total | 1,749 | 1,687 | 1,852 | 2,053 | 1,781 | 1,733 | 1,798 |

Prof. UGO PAPI, Segretario generale dell'Istituto, Direttore responsabile.

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following explanations refer to crop conditions quoted in the crop notes and in the tables. — Crop condition according to the system of the country: Germany, including Ostmark and Sudetenland, Bohemia and Moravia (Protectorate); Hungary and Luxemburg: 1 = excellent, 2 = good, 3 = average, 4 = poor, 5 = very poor; Finland: 8 = very good, 6 = above the average, 5 = average; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = poor; Estonia, Latvia, Lithuania, Poland, Romania and Sweden: 5 = excellent, 4 = good, 3 = average, 2 = poor, 1 = very poor; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; Portugal: 100 = excellent, 80 = good, 60 = average, 40 = poor, 20 = very poor; Switzerland: 100 = excellent, 90 = very good, 75 = good, 60 = fairly good, 50 = average, 40 = rather poor, 30 = poor, 10 = very poor; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = poor; Canada: 100 = crop condition promising a yield equivalent to the average yield of a long series of years; United States: 100 = crop condition which promises a normal yield; Egypt: 100 = crop condition which promises a yield equal to the average yield of the last five years. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

NOTE: The countries are listed throughout by continents (Europe, followed by the U. S. S. R., America, Asia, Africa and Oceania) in the French alphabetical order. In the tables the Northern Hemisphere precedes the Southern Hemisphere.

See latest information on page 606.

VEGETAL PRODUCTION

THE WHEAT CROP IN 1940.

The information on the wheat crop in Europe which has reached the International Institute of Agriculture after the publication of the August Bulletin, is not such as to allow a substantial modification of the global estimate made the previous month, of which it is necessary to emphasize once more the very approximate character. In fact the lack of official figures from several important producing countries has necessitated a great amount of conjecturing based, more or less, on the general data which may be gathered in the present circumstances.

The most recent information confirms that the wheat production in the Danubian countries has been decidedly unfavourable. It can be said that the total crops of Romania, Yugoslavia, Hungary and Bulgaria are only slightly above 295 million bushels, which means a decrease of about $\frac{1}{3}$ in comparison with last year and $\frac{1}{3}$ of the yearly average from 1934 to 1938. In the presence of the situation created by this heavy reduction in the production of wheat, it is worth mentioning that the maize crop, which with wheat contributes to a large extent to the nutrition of these countries, appears to have improved remarkably, owing to the favourable weather conditions in the last period of ripening, and an abundant yield is expected.

Cereal Production.

| COUNTRIES AND PRODUCTS | 1940 | | | Average 1934 to 1938 | | | 1940 | | | Average 1934 to 1938 | | | % 1940 | |
|-----------------------------|------------------|---------|--------|----------------------------|--------|---------|------------------|-----------|-----|----------------------------|------------------|-------|--------|--|
| | Thousand centals | | | Thousand bushels | | | Thousand bushels | | | 1939 = 100 | Average = 100 | | | |
| WHEAT | | | | | | | | | | | | | | |
| Spain | * | 72,753 | 63,447 | (1) | 93,264 | * | 121,252 | 105,742 | (1) | 155,437 | 114.7 | 78.0 | | |
| Greece | | 20,503 | 22,975 | | 16,616 | | 34,171 | 38,291 | | 27,693 | 89.2 | 123.4 | | |
| Hungary | (2) | 46,813 | (3) | 67,862 | (4) | 48,933 | (2) | 78,020 | (3) | 81,554 | — | — | | |
| Italy | | 160,938 | | 175,929 | | 160,487 | | 268,225 | | 293,210 | 91.5 | 100.3 | | |
| Romania | (5) | 36,402 | | 98,169 | | 74,044 | (5) | 60,669 | | 163,611 | — | — | | |
| Slovakia | | 7,527 | | 8,400 | | — | | 12,546 | | 13,999 | 89.6 | — | | |
| Sweden | | 6,409 | | 15,396 | | 12,759 | | 10,681 | | 25,659 | 41.6 | 50.2 | | |
| U.S.S.R.: Estonia | | 1,676 | | 1,880 | | 1,648 | | 2,792 | | 3,133 | 89.1 | 101.7 | | |
| Canada | {(w) | 13,728 | | 13,363 | | 8,437 | | 22,880 | | 22,271 | 102.7 | 162.7 | | |
| United States | {(s) | 322,934 | | 280,411 | | 149,630 | | 538,224 | | 467,352 | 115.2 | 215.8 | | |
| Mexico | {(s) | 333,503 | | 338,059 | | 335,654 | | 555,839 | | 563,431 | 98.7 | 99.4 | | |
| India (6) | | 136,633 | | 114,924 | | 94,772 | | 227,721 | | 191,540 | 118.9 | 144.2 | | |
| Turkey | | 7,740 | | 8,863 | | 6,932 | | 12,900 | | 14,771 | 87.3 | 111.7 | | |
| Egypt | | 239,098 | | 220,013 | | 219,475 | | 398,496 | | 366,688 | 108.7 | 108.9 | | |
| | | 102,074 | | 101,587 | | 75,101 | | 170,121 | | 169,309 | 100.5 | 135.9 | | |
| | | 29,885 | | 29,406 | | 26,102 | | 49,807 | | 49,009 | 101.6 | 114.5 | | |
| RYE | | | | | | | | | | | | | | |
| Spain | * | 15,432 | 9,045 | (1) | 10,981 | * | 27,558 | 16,152 | (1) | 19,608 | 170.6 | 140.5 | | |
| Greece | | 1,275 | 1,376 | | 1,248 | | 2,278 | 2,457 | | 2,229 | 92.7 | 102.2 | | |
| Hungary | (2) | 16,771 | (3) | 19,042 | (4) | 15,361 | (2) | 29,948 | (3) | 34,004 | — | — | | |
| Romania | (5) | 3,803 | | 9,513 | | 8,625 | (5) | 6,791 | | 16,987 | — | — | | |
| Slovakia | | 4,991 | | 4,894 | | — | | 8,912 | | 8,740 | 102.0 | — | | |
| Sweden | | 6,316 | | 8,042 | | 9,036 | | 11,279 | | 14,361 | 78.5 | 69.9 | | |
| U.S.S.R.: Estonia | | 4,211 | | 5,019 | | 4,216 | | 7,519 | | 8,963 | 83.9 | 99.9 | | |
| Canada | {(w) | 5,998 | | 6,820 | | 3,065 | | 10,710 | | 12,178 | 87.9 | 195.7 | | |
| United States | {(s) | 2,174 | | 1,752 | | 894 | | 3,883 | | 3,129 | 124.1 | 243.1 | | |
| Turkey | | 20,973 | | 21,979 | | 23,115 | | 37,452 | | 39,249 | 95.4 | 90.7 | | |
| Egypt | | 11,464 | | 9,396 | | 7,579 | | 20,472 | | 16,779 | 122.0 | 151.3 | | |
| BARLEY | | | | | | | | | | | | | | |
| Spain | * | 44,093 | 31,048 | (1) | 48,808 | * | 91,861 | 64,685 | (1) | 101,684 | 142.0 | 90.3 | | |
| Greece | | 5,280 | 4,877 | | 4,336 | | 11,001 | 10,160 | | 9,034 | 108.3 | 121.8 | | |
| Hungary | (2) | 15,642 | (3) | 17,407 | (4) | 13,402 | (2) | 32,588 | (3) | 36,265 | — | — | | |
| Romania | (5) | 14,674 | | 17,999 | | 22,736 | (5) | 30,572 | | 37,498 | — | — | | |
| Slovakia | | 6,028 | | 5,864 | | — | | 12,559 | | 12,218 | 102.8 | — | | |
| U.S.S.R.: Estonia | | 1,830 | | 1,985 | | 2,077 | | 3,812 | | 4,136 | 92.2 | 88.1 | | |
| Canada | | 53,058 | | 49,511 | | 38,880 | | 110,538 | | 103,147 | 107.2 | 136.5 | | |
| United States | | 146,378 | | 132,623 | | 98,233 | | 304,955 | | 276,298 | 110.4 | 149.9 | | |
| Turkey | | 50,045 | | 50,601 | | 43,218 | | 104,262 | | 105,420 | 98.9 | 115.8 | | |
| Egypt | | 5,315 | | 5,251 | | 4,951 | | 11,073 | | 10,939 | 101.2 | 107.3 | | |
| OATS | | | | | | | | | | | | | | |
| Greece | | 3,840 | 3,343 | | 2,479 | | 12,001 | 10,447 | | 7,748 | 114.9 | 154.9 | | |
| Hungary | (2) | 9,647 | (3) | 8,067 | (4) | 5,944 | (2) | 30,148 | (3) | 25,209 | — | — | | |
| Romania | (5) | 10,032 | | 10,736 | | 13,140 | (5) | 31,349 | | 33,548 | — | — | | |
| Slovakia | | 4,192 | | 3,439 | | — | | 13,100 | | 10,747 | 121.9 | — | | |
| U.S.S.R.: Estonia | | 3,263 | | 3,295 | | 3,190 | | 10,196 | | 10,296 | 99.0 | 102.3 | | |
| Canada | | 137,732 | | 130,698 | | 110,641 | | 430,413 | | 408,432 | 105.4 | 124.5 | | |
| United States | | 386,208 | | 299,909 | | 304,176 | | 1,206,901 | | 937,215 | 128.8 | 127.0 | | |
| Turkey | | 7,937 | | 6,512 | | 4,842 | | 24,802 | | 20,351 | 121.9 | 163.9 | | |

(w) Winter crop. — (s) Spring crop. — * Unofficial estimate.

(1) Average 1934 to 1936. — (2) Including the reannexed northern zone and Sub-Carpathia. — (3) Including the reannexed northern zone but excluding Sub-Carpathia. — (4) Territory as at the end of 1937. — (5) Not including Bessarabia and North Bucovina. — (6) Second estimate.

As regards the countries of the Mediterranean basin (Italy, Spain, Greece, Portugal etc.) the forecast last month was for a total yield of 440 million bushels, remarkably similar to the average from 1934 to 1938, but about 20 million bushels lower than in 1939. This forecast still holds. According to the latest information, it seems that the production in Greece is somewhat higher than had been expected, while on the contrary the information now available about Portugal shows that the wheat crop in that country is decidedly below the average.

Regarding the numerous and important group of the countries of the central European zone (France, Germany, Belgium, The Netherlands, Luxembourg, Switzerland, The Protectorate of Bohemia and Moravia, Slovakia and the territories of Poland within the old frontiers) most of which have suspended the publication of agricultural statistics, it is now available, together with some previous data, a first global estimate of the cereals crops in Germany and in the part of Poland attached to Germany. These data indicate, for the whole of the cereals, a production considerably lower than that of 1939, but only slightly under the average. It is probable that the decreases were higher in the case of wheat than in that of the other cereals which, generally speaking, withstood the unfavourable weather conditions better than wheat. The forecast made last month for this group of countries of the central zone of Europe, although largely conjectural, may still be considered correct: about 560 million bushels of wheat, as against 650 million bushels in 1939 and an average of 660 million bushels in the years 1934-1938.

In Sweden, the first official estimate of the winter wheat crop shows a decrease of almost 60 per cent over last year, and of one half over the average. In Denmark the wheat crop was further damaged during the month of August, and the yield may be $\frac{1}{3}$ lower than in 1939. In Lithuania the forecast is for a yield 16 per cent lower than that of last year. The production in Estonia is about average, but nearly 10 per cent lower than that of 1939. On the basis of this new information, it may be assumed that the estimate made a month ago for the global production of the countries of the northern zone (United Kingdom, Ireland, Scandinavian and Baltic countries), which was put at 130 million bushels as against 150 in 1939 and an average 136 for the previous five years, should rather be lowered than increased.

All in all, it seems probable that the Institute estimate of the total production of the European countries, not including the U. S. S. R. (within the frontiers of 1939, i. e., without considering the territorial changes brought about by the incorporation within the U. S. S. R. of certain territories), which last month had been put at about 1460 million bushels, should be lowered by about 35 million bushels. It would thus be about 275 million bushels, i. e., 16 per cent. lower than the 1939 production, and about 160 million bushels, i. e., 10 per cent. lower than the average from 1934 to 1938.

If these conclusions are examined from the point of view of the food situation in Europe, it must be mentioned not only that the results of the production have been generally less unfavourable for the other cereals than for wheat, but also that the potato crop appears to be very abundant in several countries where this product plays an important role among national foodstuffs.

The wheat production in the U. S. S. R. is still considered satisfactory. It is particularly confirmed that the yield of the wheat crop in Ukraine is remarkably high.

In North America the crops appear now much more abundant than it had been foreseen. In the United States the estimate of the spring wheat production made in September by the Department of Agriculture is 10 per cent. higher than the same Bureau had forecast on the basis of the condition of the crop at the beginning of August. It is now put at about 228 million bushels. By adding this figure to the 556 million bushels of the winter wheat crop, a total crop of 784 million bushels is attained: this quantity is about 4 per cent higher than that of 1939 and 9 per cent than the average of the previous five years. This result is the more remarkable as the surfaces sown to wheat this year were reduced, and as the conditions of the autumn wheat crop at the end of last year bespoke a very poor yield. An improvement however was registered from month to month. The first indication on the probable size of the autumn wheat crop, published in December 1939, seemed to forecast a crop of 399 million bushels; later the official estimate rose that figure to 426 million bushels in April, 460 million bushels in May, 489 in June, 524 in July and 556 in August. In conclusion, the average yield of the autumn and summer wheat in the United States has been the highest since 1931, i. e., 14.9 bushels per acre, as against 14.1 in 1939 and an average 12.8 during the preceding five years.

In Canada also the first estimate of the spring wheat production, published this month by the Ministry of Agriculture, shows results far above those estimated on the basis of the crop condition at the beginning of August. The expected crop of 538 million bushels is by 15 per cent higher than last year, and the highest attained in Canada since 1928. Taking into account also the winter crop, the total wheat production amounts to 561 million bushels. The average yield of 19.5 bushels per acre, is the highest for the last twelve years.

Wheat production.

| YEAR | Production in million of bushels | | | | | Yields in bushels per acre | |
|----------------|----------------------------------|--------------|-------|--------|--------------------------------|----------------------------|--------|
| | United States | | | Canada | Total United States and Canada | United States | Canada |
| | Winter wheat | Spring wheat | Total | | | | |
| 1940 | 556 | 228 | 784 | 561 | 1,345 | 14.9 | 19.5 |
| 1939 | 563 | 192 | 755 | 490 | 1,245 | 14.1 | 18.3 |
| 1938 | 688 | 244 | 932 | 360 | 1,292 | 13.3 | 13.8 |
| 1937 | 686 | 190 | 876 | 180 | 1,056 | 13.6 | 7.1 |
| 1936 | 520 | 107 | 627 | 219 | 846 | 12.8 | 8.6 |
| 1935 | 465 | 161 | 626 | 282 | 908 | 12.2 | 11.7 |
| 1934 | 438 | 88 | 526 | 276 | 802 | 12.1 | 11.5 |
| 1933 | 377 | 175 | 552 | 282 | 834 | 11.2 | 10.8 |
| 1932 | 492 | 265 | 757 | 443 | 1,200 | 13.1 | 16.3 |
| 1931 | 826 | 116 | 942 | 321 | 1,263 | 16.3 | 12.3 |
| 1930 | 633 | 253 | 886 | 421 | 1,307 | 14.2 | 17.0 |
| 1929 | 586 | 237 | 823 | 305 | 1,128 | 13.0 | 12.0 |
| 1928 | 579 | 335 | 914 | 567 | 1,481 | 15.4 | 23.5 |

Thus it appears that the total wheat crop of the two great producing countries of North America is the highest registered after the exceptionally abundant one of 1928.

No new information has been received by the Institute beside that already available for the other countries of the northern hemisphere.

As regards the chief producing countries of the southern hemisphere, the first estimate of the surfaces sown to wheat in Argentina shows a decrease of 4.4 per cent in comparison with last year, and of 7.7 per cent. of the average of the five preceding years. Weather conditions during the month of August were favourable to the crop, the state of which at the end of the month was considered good.

In Australia, on the contrary, the persistent drought hindered the sowings and damaged the germination of the seeds. Owing to these circumstances, it is gathered from private sources that the next crop will be greatly reduced and will hardly reach one half of the quantity obtained last year.

CURRENT INFORMATION FROM VARIOUS COUNTRIES ON WHEAT, RYE, BARLEY AND OATS.

Germany: Weather conditions during the 1939-40 agricultural season were featured by an extremely cold winter, followed by an exceptionally warm period between the end of Spring and the beginning of Summer, and lastly by great dampness at the time of reaping. In spite of these extremely unfavourable circumstances, the difficulties which hindered the autumn and spring sowings and the scarcity of labour, the total cereal production of the Great Reich -- not including the territories of the Protectorate of Bohemia and Moravia and those of Poland attached to Germany -- is officially estimated at 54,234 million lb., with a diminution of about 2 per cent. as compared with 55,330 million lb., which was the average registered during the five-year period 1934-38. According to the same source, the production in the territories of Poland attached to Germany is estimated at a minimum of 7,716 million lb.

At the end of the 1939-40 commercial season, the stocks of bread grains available in Germany from previous crops amounted to 13,660 million lb., and the stocks of flour in the bakeries at 330.7 million lbs.

Bulgaria: Notwithstanding the fact that conditions were generally unfavourable, (cold and rainy in the spring, hot, excessive rains which caused rust and lodging, etc., in the summer) the unit yield of winter wheat is estimated this year at 10.7 centals per acre (17.8 bushels), as against 6.7 to 8.0 centals per acre (11.2 to 13.4 bushels) generally obtained from poor crops. This yield is considerably lower than the very good one of last year (13.4 centals per acre (22.3 bushels)). Rye, barley and oats were also very badly affected by the weather, especially by the cold and dampness of the spring. Unit yields which, according to the first forecasts seemed higher than those of last year, appear now to be lower, especially those of rye and barley.

Denmark: In spite of cold and rainy weather during August, cereal crops, with the exception of wheat, improved as compared with their condition in the preceding month.

The condition of cereals according to the Institute system was as follows:

| | September 1st 1940 | August 1st 1940 | September 1st 1939 |
|------------------|-----------------------|--------------------|-----------------------|
| Wheat | 64 | 67 | 94 |
| Rye | 88 | 86 | 91 |
| Barley | 88 | 86 | 85 |
| Oats | 84 | 84 | 87 |
| Meslin | 83 | 82 | 84 |

Finland: During August the temperature was slightly above the average. Rains were very abundant in the northern parts of the country, somewhat under the average in the central parts and normal in the south. The crops which appear inferior to those of last year, were improving especially in the central and southern parts of the country. Damages caused by plant diseases were nearly insignificant.

Areas under cereals.

| COUNTRIES | 1940 | | 1939 | | Average 1934 to 1938 | | % 1940 | | 1940 | | 1939 | | Average 1934 to 1938 | | % 1940 | |
|----------------------------------|-----------|-----------|----------------------------|---------------|----------------------------|-----------|-----------|----------------------------|---------------|------------------|------|------|----------------------------|---------------|------------------|-----------|
| | 1940 | 1939 | Average 1934 to 1938 | 1939 = 100 | Average = 100 | 1940 | 1939 | Average 1934 to 1938 | 1939 = 100 | Average = 100 | 1940 | 1939 | Average 1934 to 1938 | 1939 = 100 | Average = 100 | |
| | | | | | | | | | | | | | | | | ooo acres |
| | WHEAT | | | | | | | | RYE | | | | | | | |
| Greece | 2,599 | 2,356 | 2,072 | 110.3 | 125.4 | 163 | 156 | 170 | 104.6 | 96.2 | | | | | | |
| Hungary | (1) 4,313 | (2) 4,626 | (3) 3,926 | — | — | (1) 1,624 | (2) 1,718 | (3) 1,558 | — | — | | | | | | |
| Luxembourg | w) 35 | 38 | 45 | 91.1 | 76.2 | 16 | 18 | 18 | 89.8 | 89.2 | | | | | | |
| Romania | (4) 4,564 | 10,079 | 8,560 | — | — | (1) 426 | 1,107 | 1,037 | — | — | | | | | | |
| Sweden | 764 | 828 | 716 | 92.2 | 106.6 | 425 | 463 | 539 | 91.9 | 78.8 | | | | | | |
| U. S. S. R.: Lithuania | (5) 498 | (5) 512 | (6) 512 | 97.1 | — | (5) 1,428 | (5) 1,410 | (6) 1,255 | 101.3 | — | | | | | | |
| Canada | w) 775 | 735 | 590 | 105.5 | 131.4 | 786 | 891 | 565 | 88.2 | 139.2 | | | | | | |
| United States | s) 27,951 | 26,021 | 24,451 | 107.4 | 114.3 | 249 | 211 | 168 | 118.0 | 147.9 | | | | | | |
| India | w) 34,922 | 37,802 | 40,498 | 92.4 | 86.2 | 3,086 | 3,811 | 3,363 | 81.0 | 91.8 | | | | | | |
| Egypt | s) 17,758 | 15,894 | 15,058 | 111.7 | 117.9 | — | — | — | — | — | | | | | | |
| Argentina (7) | 33,666 | 34,941 | 34,585 | 96.4 | 97.3 | — | — | — | — | — | | | | | | |
| Egypt | 1,563 | 1,501 | 1,452 | 104.1 | 107.6 | — | — | — | — | — | | | | | | |
| Argentina (7) | 17,051 | 17,833 | 18,473 | 95.6 | 92.3 | 2,718 | 2,296 | 2,105 | 118.4 | 129.1 | | | | | | |
| | BARLEY | | | | | | | | OATS | | | | | | | |
| Greece | 554 | 532 | 511 | 104.2 | 108.6 | 434 | 373 | 339 | 116.3 | 128.0 | | | | | | |
| Hungary | (1) 1,300 | (2) 1,321 | (3) 1,135 | — | — | (1) 793 | (2) 633 | (3) 542 | — | — | | | | | | |
| Romania | (4) 1,604 | 2,708 | 3,857 | — | — | (4) 1,406 | 1,455 | 1,910 | — | — | | | | | | |
| U. S. S. R.: Lithuania | (5) 558 | (5) 550 | (6) 521 | 101.6 | — | (5) 944 | (5) 941 | (6) 858 | 100.4 | — | | | | | | |
| Canada | 4,342 | 4,347 | 4,144 | 99.9 | 104.8 | 12,298 | 12,790 | 13,435 | 96.2 | 91.5 | | | | | | |
| United States | 13,290 | 12,546 | 9,555 | 105.9 | 139.1 | 34,585 | 33,574 | 34,715 | 103.0 | 99.6 | | | | | | |
| Egypt | 278 | 273 | 280 | 101.9 | 99.2 | — | — | — | — | — | | | | | | |
| Argentina (7) | 2,056 | 2,122 | 1,975 | 96.9 | 104.1 | 3,707 | 3,446 | 3,251 | 107.6 | 114.0 | | | | | | |

w) Winter crops. — s) Spring crops. — (1) Including the reannexed northern zone and Sub-Carpathia. — (2) Including the reannexed northern zone but excluding Sub-Carpathia. — (3) Territory as at the end of 1937. — (4) Not including Bessarabia and Northern Bucovina. — (5) Present territory. — (6) Former territory. — (7) Areas sown for the 1940-41 crop.

Greece: According to more recent information the wheat crop appears to be somewhat more favourable than it was at first estimated. Still it remains from 5 to 7 percent. lower than the production last year. The production of rye, which at first had been estimated lower than that of last year, now appears to be more abundant and even larger than last year. Very abundant crops are forecasted for barley and oats.

The area under meslin in 1940 is estimated at 158,600 acres against 153,100 acres in 1939 and an average of 138,000 acres in 1934 to 1938; percentages, 103.5 and 114.9.

Hungary: During the three weeks following July 30, ult., the weather was quite changeable, generally abnormally cold for the time of the year and damp. Sunny days were few. During the same period, particularly in the last days, even sunny days were not sufficiently warm, while on the contrary nights were too cold, considering the season. The number of sunny days was under the average.

Rains were above the average in most parts of the country. Only over $\frac{1}{3}$ of the territory, rains were under the average. In the rest of the country the average was surpassed, and rains varied from average and double the average.

During all that time it rained daily. In most cases rains were accompanied by storms; but there were also light rains which entirely soaked the soil. Over a large section of the country on one day, August 12, there were heavy showers and torrential rains reaching over 4 inches, in several places.

Persistent rainy weather was unfavourable to agriculture. The soil was so soaked that only with considerable delay the preparatory work for the Autumn sowings, housing and thrashing were completed.

Part of the cereals became wet in sheaf, on the stubbles and began to germinate standing.

It was even to be feared whether the farmers, after completing housing and threshing would be able to complete the work of tilling and Autumn sowing on time. Autumn works will also be hindered by the ripening and late gathering of potatoes and sugar beets.

The mowing of wheat has been completed everywhere. The works of gathering, milling and threshing are now on, though everywhere hindered by too heavy and frequent rains.

Forecasts were for a wheat production below the average. This can be explained on one side by the fact that wheat became somewhat thick before mowing, and on the other side by the fact that too heavy rains caused considerable damage to wheats bundled and mowed.

Housing, threshing and mowing of rye was still going on. These works were hindered by frequent rains, which have also damaged the colour and the quality of the grains.

Forecasts are for a rye production under the average.

The threshing of autumn barley was nearly over. The grains are full enough, but they are discolored on account of too heavy rains.

The threshing of spring barley was also nearly over. The crop is mediocre as to quality, but good as to quantity.

The reaping of oats is mostly over. The works of housing and threshing were being carried on. The grains are full and of good quality.

The forecast is for a good average yield of the oats crop.

On 20th August the early crops of millet were ripening. Harvest had begun in several places. The panicles are well developed and promise a good yield. Crops sown in stubble fields were growing in an even manner and were vigorously developing.

Buckwheat, as a main crop, had ceased blooming and was very vigorous; as an intercalary crop it appeared very satisfactory, but needed more sunshine.

Portugal: It is confirmed that the wheat production is rather scarce this year: it is estimated that it will be about $\frac{1}{3}$ that of last year which was around 11 million centals (18 million bushels). The average production in the quinquennium 1934-1938 was over 10 million centals (16,5 million bushels). The other cereal crops are also poor.

Romania: The dry soil makes work on the land very difficult. There is also a lack of labour animals. The Ministry of Agriculture has taken all the necessary measures to have all tractors utilized.

According to the plan for the 1940-41 campaign prepared by the Direction of agricultural economics of the Ministry of Agriculture, the surfaces to be sown are 5,680,000 acres, as against 4,450,000 last year for autumn wheat, 300,000 acres as against 200,000 for autumn rye and 150,000 acres as against 120,000 for autumn barley.

Sweden: The temperature in the first weeks of July was rather high; but it got cooler in the largest part of the country towards the end of the month. The rains fallen during the month, partly under the form of storms, were distributed very irregularly both as to time and locality. In August the average temperature was below the normal nearly in every part of the country. The quantity of rain in most of the regions was above the average, but their distribution during the same month was quite uneven. The report published at the middle of July had already mentioned that the forecasts for the wheat and rye crops had become less favourable after the end of May on account of the persistent drought during the spring and the first part of summer. The rains that followed, came too late to cause an improvement in the situation. At the end of August the gathering in of the autumn cereals had already been effected over most of the country under unfavourable weather conditions. The crops which were still in the fields often showed signs of more or less serious damages caused by cryptogamic diseases and by the rain. The autumn wheat crop is very poor and nearly a complete failure, while autumn rye held better. Summer cereals had been generally harvested by the end of August, but, owing to bad weather, the crop had been gathered in only in part. The persistent drought in the first part of summer caused a poor straw yield, thinly scattered crops and irregular ripenings. Rains occurred too late for these cultures also: if in some places they brought some benefice, in other regions they damaged the grains and retarded gathering.

Yugoslavia: In the first half of the month of August, the weather was changeable, cloudy and mostly rainy and rather warm. It turned to very hot during the second week. In the second half of the month the weather from cloudy and rainy in the beginning, turned to fair and less warm towards the end. These conditions were generally favourable to the housing and threshing of cereals.

The most recent unofficial information confirms the forecast for a poor cereal crop. According to the same source the production of wheat is estimated at 40 millions centals (65 million bushels), against 55-65 million centals (90-110 million bushels) during the last years. As the home wheat needs of the country are approximately calculated to be 48 million centals (81 million bushels) and as 4,4 millions centals (7.3 million bushels) represented the surplus of the preceding campaign, the country was in some difficulty as regards the provisioning of wheat till the arrival on the markets of the new crop. This caused a strong increase of the wheat prices in the country. The unfavourable forecast regarding the other cereals, especially barley, have also caused a sharp increase in prices.

U. S. S. R.: During the month of August and the first ten days in September the weather was favourable to the cereals crop. At the 10th September the mowing of straw cereals in the whole of the territory of the Union (old frontiers) had been effected over 196,407,000 acres, *i. e.*, the 92 per cent. of the surfaces sown according to the plan. The year before at the same date the surface harvested amounted to acres 193,049,000 (92 per cent.). Threshing is somewhat delayed, as compared with last year: at the 10th September the production of 146,140,000 acres had been threshed — 74 per cent. of the surface harvested — instead of 149,970,000 acres — 78 per cent. of the harvested surface in 1939.

Official data on the results of the crop are still lacking; available data however indicate generally good yields. Ukraine as a whole, and some regions in particular, show a very high yield.

The forecast for winter wheat production in Lithuania is 6.8 times higher than the quantity of the seeds sown and that of winter rye is 5.8 times higher, as against respectively 8.1 and 8.3 times the quantity of seeds sown in 1939. As regards the spring crops, their condition at the 1st August was the following:

| | 1-VIII-1940 | 1-VII-1940 | 1-VIII-1939 |
|------------------------|-------------|------------|-------------|
| Spring wheat | 2.7 | 2.8 | 3.2 |
| Meslin | 3.0 | 2.7 | 3.5 |
| Barley | 2.6 | 2.8 | 3.2 |
| Oats | 2.8 | 2.8 | 3.5 |

In Estonia the production of meslin in 1940 is estimated at 3,064,000 centals, (5,284,000 bushels) against 3,310,000 (5,707,000) in 1939 and an average of 2,079,000 (3,585,000) in 1934 to 1938; percentages, 92.6 and 147.4.

Conditions are favourable to the sowing of winter cereals: at the 10th September sowings in the whole of the territory of the U. S. S. R. (old frontiers) had been effected over 58,060,000 acres, corresponding to 64 per cent. of the surfaces to be sown according to the plan, as against 56,141,000 acres—72 per cent. of the plan—at the same date last year. The plan calls for an extension of 2 per cent. of the surfaces to be sown to winter crops compared with those of the 1939 plan.

At the beginning of September the conditions of winter cereals already sown were good.

Argentina: Weather conditions during August were favourable to cereal crops in the most important producing districts. According to an official report dated September 3, the situation of the wheat production in particular at the end of August was good.

Canada: During the first half of August weather in Manitoba was ideal for harvesting with high temperatures and practically no rain. About 50 per cent. of the crop had been cut and threshing had started. Yields varied greatly. In southern districts the condition of late sown crops was looking particularly good; coarse grains were promising and the wheat crop was expected to be heavy. In central districts cutting was almost completed and threshing was commencing with deliveries of the new crop to elevators. Harvesting was well under way in the north. Some early fields had already been combined and the quality of the grain was excellent.

In Saskatchewan the extremely warm, bright weather and lack of precipitation resulted in rapid maturing of grain. Although this was considered as a possible cause of some decline in yield prospects, the danger of frost and rust injury has been minimized. Wheat cutting was general in the south east and was progressing in south-central, east-central and central parts of the province.

Hot, dry weather over Alberta hastened maturity of all cereal crops. While most sections were reporting adequate moisture reserves to support rapid filling and ripening, some areas, particularly Lacombe and in the north east, needed more rain to prevent premature ripening of late grains and shrinking of kernels. Cutting of wheat was well started in the south and in the Peace River district. In the remainder of the province, wheat was turning colour rapidly with heads well filled, but late crops for the most part were still green. Grasshoppers were beginning to damage oats and barley fields in southern Alberta. The wheat stem sawfly was causing up to 15 per cent. damage in some areas in the south. Extensive hail damage was reported from sections in the northeast.

United States: During the week ending August 27, in the east of Great Plains temperature was generally below normal. Moderate to heavy rains benefited many parts of Central States, but in the western parts of Great Plains weather continued unfavourably dry. Harvesting of spring wheat was somewhat delayed by rain. During the week ending September 3, in the Eastern States weather was chargeable, rainy and generally dry in Western States. Showers interrupted threshing of spring wheat causing deterioration of grain in stocks. Winter wheat plowing started but seeding was little except in Kansas where germination was favourable.

The week ending September 10 was featured by rather high temperature and much sunshine; in general rains were light. The weather was favourable for maturing crops. Small grains were mostly threshed. Winter wheat plowing progressed well and seeding started. During the week ending September 17, the weather was generally fair, ideal for harvesting late crops. In the most of winter wheat belt, the soil was too dry for plowing and seeding. During the following week high temperature and inadequate rain increased drought conditions in the Central and Eastern States, but light rain later relieved most sections between the Appalachians and the Rockies. Plowing and seeding small grains progressed slowly in the Eastern States.

CURRENT INFORMATION ON MAIZE.

Bulgaria: The condition of the production of maize at the middle of July was very good. Excessive heat and consequently the drought which prevailed during most of the month of July, coinciding with the formation of the ears, hindered the growth of maize and damaged the crop. But the rains that followed towards the end of July and during the first half of August improved considerably the situation of maize nearly everywhere, except some localities in the north-east and south-east of the country where insufficient rains injured the crop. In spite of all this however, the maize crop appears generally good all over the country, and even larger than last year when it was also very abundant.

Greece: Weather conditions have continued favourable to the maize crop also during the month of August. The forecast is for a good production, even considerably higher than that of last year.

Hungary: On 20th August maize was growing well, but more sunshine was needed. Ears were large and abundant.

On the basis of crop conditions on 10th September the production for the old territory including the Northern reembodyed section and Sub-Carpathia was estimated at 66,741,000 centals (119,180,000 bushels). In 1939, on the territory including the northern reembodyed section, but excluding Sub-Carpathia, the production was of

51,468,000 centals 91,907,000 bushels) and during the five years period 1934-1938, on the Hungarian territory at the end of 1937, it attained 50,840,000 centals (90,787,000 bushels).

Portugal: The weather in this last period has been favourable to maize. An abundant crop is expected.

Romania: Towards the middle of September the ripening of maize was favoured by dry weather. The forecast is for a satisfactory crop, which will be sufficient for home needs.

Yugoslavia: Frequent rains in the first half of August were favourable to the growth of maize in general, but they hindered the formation and the ripening of the grains. During the second part of August, the warm weather and the lack of heavy rains were favourable to the formation and ripening of the grains of maize. Towards the end of the month the state of cultivation of the maize was good nearly everywhere, and especially in the regions of Backa, Srem, Slavonia and Herzegovina. An exceptionally abundant crop is expected all over the country. According to very recent unofficial data, the crop may reach and even surpass the record production of 1936 and 1937 (115 million centals = 205 million bushels, and 117 million centals = 209 million bushels).

United States: During the week ending August 28 rains helped the culture in some section, though crops generally needed warm and dry weather. In the week ending September 3 the maize belt needed high temperatures for a long period. During the week ending September 10, conditions were favourable in a large area of the belt. During the following two weeks the weather was somewhat cool at the beginning and then favourable for maturing maize.

The production of maize is now estimated at 1,286,424,000 lbs. (2,297,186,000 bushels), with an increase of 27,406,000 lb. (or 49,000 bushels) on that of last month, against 1,466,710,700 lb. (2,619,137,000 bushels) in 1939 and 1,174,369,000 lb. (2,097,088 bushels) in the five years 1934-1938: percentages 87.7 and 109.5.

Egypt: At the end of August sowing of the nili maize crop was over in Lower Egypt, and about its end in Middle Egypt. Late sowing was progressing in the Qena and Girga provinces. The crop was estimated to be ten days later than last year, owing to the scarcity of water in July. Growth was satisfactory. Flowering started in early cultivations in the Southern Delta. Copping too was noticed but only in some fields. Crop condition in general was normal.

CURRENT INFORMATION ON RICE.

Italy: According to press news, this year the rice production is considered very good; much higher, in fact, than the already high production of 1939.

Portugal: The production of rice in 1939 is estimated at 1,579,400 centals (3,509,600 bushels) against 1,508,200 (3,351,600) in 1938 and an average of 1,358,300 (3,018,500) in 1933 to 1937: percentages, 104.7 and 116.3.

United States: The production of rice in 1940 is now estimated at 23,526,000 centals (52,280,000 bushels) against 23,538,000 (52,306,000) in 1939 and an average of 21,078,000 (46,839,000) in 1934 to 1938; percentages, 100.0 and 111.6.

Egypt: At the end of August, the seifi rice crop condition was much better than a month before, owing to increased water supply for irrigation, the flood being abundant, although late. Shooting of ears was progressing in early as well as in some gen-

eral cultivations. Filling of the grains started on some areas. Watering, draining, manuring and weeding were progressing. During the month was completed the transplantation of most areas, which were damaged by scarcity of water in July. Crop condition in general is somewhat below average.

Sowing of nili rice crop was about its end, three weeks later than last year, owing to the scarcity of water. Germination and growth were satisfactory.

CURRENT INFORMATION ON POTATOES.

Germany: Weather conditions were very favourable to the potato crop and a very abundant yield is expected.

Denmark: According to the Institute system the conditions of the potato crop at September 1st, 1940 was 95 as against 91 at August 1st, 1940 and 96 at September 1st, 1939.

Finland: The potato crop was normal in spite of the drought.

Hungary: On 20 th August the pulling out of early potatoes was about over. Tubers were large, healthy and numerous. As regards late qualities, the forecasts were quite favourable, though too much rain has caused rust especially in the level sections.

On the basis of the crops condition on 10th September, the production for the old territory including the Northern reembodyed section and Sub-Carpathia was estimated of 71,523,000 centals (119,202,000 bushels). In 1939, on the territory including the northern reembodyed section, but excluding Sub-Carpathia, the production was of 50,553,000 centals 84,253,000 bushels) and, during the five years period 1934-1938, on the Hungarian territory at the end of 1937, it attained 47,014,000 centals (78,356,000 bushels).

Sweden: The potato crop, which at the middle of July was standing well the effects of the drought, was improved by rains in the second part of July and in August. At the end of August the forecast was for a good crop in spite of damages done to the leaves by the brown rust.

Yugoslavia: Weather conditions in July and August were generally favourable to the potato crop and the forecast is for an abundant production.

According to the crop condition system adopted by Sweden, the condition of potatoes at September 1st, 1940 was 3.3 as against 3.1 on September 1st, 1939.

U. S. S. R.: At the beginning of September the potato crop, in the largest part of the Union, was good, and the forecast was for an abundant yield.

In Lithuania, the state of the culture, according to the system of the country, was 3.7 at 1st August 1940, as against 3.3 at 1st July 1940 and 3.8 at 1st August 1939.

In Estonia, the production of potatoes in 1940 is estimated at 23,082,000 centals (38,470,000 bushel) against 19,274,000 (32,123,000) in 1939 and an average of 21,158,000 (35,263,000) in 1934 to 1938; percentages, 119.8 and 109.1.

Argentina: Yields in the different zones of potato production were satisfactory.

The production of potatoes in 1939-40 is estimated at 25,596,000 centals (42,659,000 bushels) against 18,715,000 (31,191,000) in 1938-39 and an average of 14,728,000 (24,546,000) in 1933-34 to 1937-38; percentages, 136.8 and 173.8.

United States: The production of potatoes in 1940 is now estimated at 229,903,000 centals (383,172,000 bushels) against 218,410,000 (364,016,000) in 1939 and an average of 227,263,000 (378,772,000) in 1934 to 1938; percentages, 105.3 and 101.2.

SUGAR SEASON IN EUROPE.

In the Bulletin issued last month it was remarked that, with the exception of a few unimportant cases, the conditions of the sugar beets crop were rather favourable to the growth of the roots. During the following period till the middle of September, conditions have remained rather satisfactory all over Europe taken as a whole.

Acreeage of Sugar-beet.

| COUNTRIES | 1940 * | 1939 | Average 1934 to 1938 | % 1940 | |
|-----------------------------|---------------|-------------|-------------------------|------------|------------------|
| | | | | 1939 = 100 | Average = 100 |
| | | | | | |
| Germany | (1) 2,000,000 | 1,402,331 | 1,110,570 | — | — |
| Belgium | 133,500 | 134,168 | 117,364 | 99 | 114 |
| Bohemian-Moravia | (1) 351,000 | (1) 280,890 | 362,766 | 125 | 110 |
| Slovakia | 47,000 | 36,300 | | 137 | 223 |
| Bulgaria | 40,000 | 28,786 | 17,713 | 115 | 108 |
| Denmark | 109,000 | 94,600 | 100,282 | 110 | 64 |
| Spain | 136,000 | (1) 120,000 | 212,299 | 56 | 94 |
| Finland | 8,150 | 14,460 | 8,664 | 107 | 114 |
| France | 670,000 | 621,015 | 585,856 | — | — |
| Hungary | (2) 180,000 | 129,700 | 114,600 | 156 | 117 |
| Ireland | 65,000 | 41,660 | 55,429 | 111 | 159 |
| Italy | 408,000 | 368,313 | 256,870 | 184 | 181 |
| Latvia | 62,000 | 33,660 | 34,101 | 141 | 176 |
| Lithuania | 30,900 | 21,890 | 17,569 | 106 | 115 |
| Netherlands | 119,808 | 112,934 | 104,411 | — | — |
| Poland | — | 406,500 | 320,886 | — | — |
| Romania | (3) 110,370 | 131,872 | 89,120 | 100 | 97 |
| United Kingdom | 350,000 | 344,400 | 354,970 | 108 | 106 |
| Sweden | 136,000 | 125,413 | 127,817 | 94 | 169 |
| Switzerland | 8,400 | 8,900 | 4,964 | 110 | 213 |
| Yugoslavia | 125,000 | 114,000 | 58,691 | — | — |
| Total Europe (a) | 5,090,120 | 4,571,792 | 4,054,942 | 111 | 125 |
| U. S. S. R. | 2,940,000 | 2,928,000 | 2,958,142 | 100 | 99 |
| Total Europe (b) | 8,030,120 | 7,499,792 | 7,013,084 | 107 | 114 |
| Canada | ... | 58,600 | 47,514 | ... | ... |
| United States | 913,000 | 937,000 | 798,800 | 97 | 114 |
| Total North America | ... | 995,600 | 846,314 | ... | ... |
| Japan | 46,500 | 48,446 | 42,481 | 96 | 109 |
| Manchukuo | ... | 54,000 | 38,885 | ... | ... |
| Turkey | 91,000 | 86,678 | 63,213 | 105 | 145 |
| Total Asia | ... | 189,124 | 144,579 | ... | ... |
| TOTALS / a) | ... | 5,756,516 | 5,045,835 | ... | ... |
| / b) | ... | 8,684,516 | 8,003,977 | ... | ... |

* Approximate data. — (a) Not including U. S. S. R. — (b) Including U. S. S. R. — (1) Licht's estimate. — (2) Including the reannexed northern zone and Sub-Carpathia. — (3) Not including Bessarabia and northern Bucovina. — (4) Average of two years.

In the north of Europe the conditions of the sugar beets crop which had been rather badly affected by the drought, were improved by rains and, in the first half of September, by dry and sunny weather. Still, although at present the state of the crops is more favourable, the weight of the roots is very low. A lower yield than last year is expected.

The conditions of the weather in the countries of Central Europe at large were favourable to the growth of the sugar beets. Rains have been abundant and sometimes even too abundant and have caused some damage to the crops especially in the lower lands. In some regions the growth of the roots was hindered by a too rigid temperature, in others by the brown rust caused by too much dampness. But the fine sunny days of the first half of September have, in a large measure, remedied these damages.

In the southern European countries the general trend of the season this year has been very favourable to the sugar beets crops. The digging has already begun and the yield appears abundant and even very much so.

* * *

By the Vienna arbitrage on 30th August whereby a part of Transylvania was assigned to Hungary, the sugar factories remaining to Romania are nine, namely those of Arad, Bod, Chitila, Giurgiu, Itcani, Ripiceni, Roman, Sambata and Sascut. Only the Targu-Meres factory has been incorporated in the territory annexed to Hungary.

CURRENT INFORMATION ON SUGAR.

Germany: Weather conditions were very favourable to the growth of sugar beets. A very abundant yield is expected.

Bulgaria: The sugar-beet season developed this year under generally favourable conditions to the growth and the concentration of sugar in the beets. A good and very abundant crop is assured.

Denmark: According to the Institute system, the crop condition of the sugar beet crop at September 1st, 1940 was 98 as against 97 at August 1st, 1940 and 107 at September 1st, 1939.

Results of the weekly analyses of sugarbeets.

| COUNTRIES | Average weight of root | | | Average weight of leaves | | | Sugar content | | | Weight of sugar per root | | |
|-----------------------|------------------------|---------------------|-----------|--------------------------|---------------------|-----------|---------------|---------------------|-----------|--------------------------|--------------------|-----------|
| | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 |
| | oz. | oz. | oz. | oz. | oz. | oz. | % | % | % | oz. | oz. | oz. |
| 3rd week of August | 12.6 | 15.1 | 9.9 | 18.2 | 20.6 | 13.6 | 14.3 | 13.3 | 14.2 | 1.8 | 2.0 | 1.4 |
| 4th week of August | 14.0 | 16.7 ⁽¹⁾ | 11.6 | 17.6 | 20.8 ⁽¹⁾ | 13.8 | 15.4 | 14.4 ⁽¹⁾ | 14.6 | 2.2 | 2.4 ⁽¹⁾ | 1.7 |
| 1st week of September | 15.6 | 17.9 | 14.0 | 17.4 | 21.4 | 14.3 | 15.7 | 15.2 | 15.1 | 2.4 | 2.7 | 2.1 |
| 2nd week of September | 16.5 | 19.0 | 15.2 | 16.9 | 19.8 | 14.3 | 16.8 | 15.8 | 15.2 | 2.8 | 3.0 | 2.3 |

⁽¹⁾ Average of four years.

Finland: The analysis of sugar beets in the first week in September showed an average weight of the tuber of 10.8 ounces as against 16.9 ounces last year and 14.5 ounces as the average. The respective weight of the leaves was 20.4, 10.9, 18.6. For the second week in September the results of the analysis are respectively: 20.2; 17.5 and 16.0 for root and 12.1; 11.5 and 19.3 for leaves.

Hungary: On 20th August sugar beets were well developed. Leaves and roots were beautiful. Excessive rains have caused damages by rust on level grounds in the two Transdanubian comitats.

The crop needed sunshine for a good development.

On the basis of crop conditions on 10th September, the production for the old territory including the Northern reembody section and Sub-Carpathia was estimated of 38,980,000 centals (1,949,000 short tons). In 1939, on the territory including the northern reembody section, but excluding Sub-Carpathia, the production was of 25,585,000 centals (1,279,000 short tons) and, during the five years period 1934-1938, on the Hungarian territory at the end of 1937, it attained 21,154,000 centals (1,058,000 short tons).

Italy: According to press information, the production of sugar beets this year is a record one, being larger by 30 per cent. than the already good one of 1939. This result is due partly to an increase of acreage, but chiefly to excellent unit yields.

Sweden: Sugar beets which at the middle of July showed the effects of the long drought, were improved by rains in the second part of July and in August. The forecasts at the end of August were, on the whole, favourable, although the yield is expected to be lower than that of last year.

According to the crop condition system adopted by Sweden, the condition of the sugar beets crop at September 1st, 1940 was 3.0 as against 3.5 at September 1st, 1939.

Yugoslavia: The very strong heat in the month of July was very favourable to the formation of sugar, in spite of rains during the same month over the zones of sugar beets production. The changing weather during the month of August which was rather rainy at first, clearer and sunshiny later, favoured the general development of sugar beets. At the end of August the conditions of the crop were very good nearly everywhere, and the production appears consequently abundant and of good quality.

Towards the middle of September the sugar factories were already busy with the transformation of sugar beets into sugar, and the appearance of sugar from the new crop is expected on home markets towards the end of September.

U. S. S. R.: Weather conditions since the end of July have been favourable to the sugar beets crop in most of the regions of production. At 1st September the weight of the leaves averaged 9.2 ounces, i. e., 0.8 ounces more than in 1937. The yield by acre was the highest registered.

During the first decade of September the digging of potatoes had begun in Khirghisia, in the region of Krassnodar, in some zones of Ukraine and in the region of Veroneje. The yields appear very satisfactory. It may be mentioned here that in 1937 the yields, over the whole of the Union, averaged 163 centals per acre (8 sh. tons per acre).

Ten of the 200 sugar factories existing in the country are already working. It is expected that at 15th September the number of factories at work will be 57, and 190 at 1st October 1940.

In Lithuania, the state of the sugar beets crop, according to the system of the country, was 3,4 at 1st August 1940, as against 2,8 at 1st July 1940 and 3,4 at 1st August 1939.

Argentina: In the zone of production of the province of Buenos Aires the gathering of sugar beets is going on with rather unsatisfactory results. The quality of the product is only fair.

The condition of the sugar cane crop appears good and a normal production is expected.

Production of Cane-Sugar.

| COUNTRIES | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | % 1939-40 | |
|-----------------------------|-------------|---------|--|-------------|------------|--|------------------|------------------|
| | ooo centals | | | short tons | | | 1938-39 = 100 | Average = 100 |
| | | | | | | | | |
| AMERICA. | | | | | | | | |
| Antigua. | 304 | 493 | 514 | 15,200 | 24,640 | 25,688 | 62 | 59 |
| Argentina. | 11,442 | 10,244 | 8,147 | 572,000 | 512,190 | 407,341 | 112 | 140 |
| Barbados. | 1,587 | 3,502 | 2,517 | 79,000 | 175,114 | 125,850 | 45 | 63 |
| Brazil. | 26,235 | 24,251 | 23,161 | 1,310,000 | 1,200,000 | 1,158,050 | 108 | 113 |
| Cuba. | 62,567 | 61,730 | 57,752 | 3,128,000 | 3,100,000 | 2,887,585 | 101 | 108 |
| Ecuador. | 507 | 483 | 413 | 25,000 | 24,100 | 20,657 | 105 | 123 |
| United States (La. & Fl.) | 10,582 | 11,660 | 7,196 | 530,000 | 583,000 | 359,800 | 91 | 147 |
| British Guiana. | 3,505 | 4,239 | 3,978 | 175,000 | 211,954 | 198,899 | 83 | 88 |
| Surinam. | 245 | 270 | 378 | 12,240 | 13,499 | 18,895 | 91 | 65 |
| Jamaica. | 2,227 | 2,642 | 2,086 | 111,000 | 132,100 | 104,287 | 84 | 107 |
| Martinique. | 1,323 | 1,433 | 1,104 | 70,000 | 72,000 | 55,206 | 92 | 120 |
| Mexico. | 6,834 | 7,772 | 6,037 | 340,000 | 388,602 | 301,854 | 88 | 113 |
| Peru. | 8,686 | 8,157 | 8,702 | 434,000 | 410,000 | 435,102 | 106 | 100 |
| Puerto Rico. | 20,393 | 17,042 | 18,515 | 1,020,000 | 852,000 | 925,750 | 120 | 110 |
| Dominican Republic. | 9,921 | 9,502 | 9,030 | 500,000 | 475,000 | 451,494 | 104 | 110 |
| St. Kitts. | 626 | 836 | 659 | 31,300 | 41,816 | 32,944 | 75 | 95 |
| St. Lucia. | 220 | 180 | 168 | 11,000 | 9,016 | 8,424 | 122 | 130 |
| Trinidad. | 2,866 | 2,877 | 2,983 | 140,000 | 143,870 | 149,129 | 100 | 96 |
| Venezuela. | 551 | 540 | 489 | 28,000 | 27,000 | 24,472 | 102 | 113 |
| Total America. | 170,621 | 167,853 | 153,829 | 8,531,740 | 8,395,901 | 7,691,410 | 102 | 111 |
| ASIA. | | | | | | | | |
| Taiwan. | 26,630 | 33,671 | 19,895 | 1,331,500 | 1,683,500 | 994,719 | 79 | 134 |
| India. | 64,155 | 55,213 | 59,190 | 3,210,000 | 2,760,600 | 2,959,455 | 116 | 108 |
| Japan. | 3,386 | 3,596 | 2,359 | 169,300 | 179,800 | 117,951 | 94 | 144 |
| Java. | 34,172 | 34,392 | 19,839 | 1,710,000 | 1,720,000 | 991,927 | 99 | 172 |
| Philippines. | 24,912 | 22,708 | 23,455 | 1,230,000 | 1,140,000 | 1,172,739 | 110 | 106 |
| Total Asia. | 153,255 | 149,580 | 124,738 | 7,670,800 | 7,483,900 | 6,236,791 | 102 | 123 |
| AFRICA. | | | | | | | | |
| Egypt. | 3,524 | 3,573 | 3,179 | 176,200 | 178,634 | 158,951 | 99 | 111 |
| Mauritius. | 5,059 | 7,084 | 5,886 | 252,930 | 354,180 | 294,310 | 71 | 86 |
| Reunion. | 1,622 | 1,890 | 1,745 | 81,100 | 94,505 | 87,267 | 86 | 93 |
| Union of South Africa | 11,623 | 11,616 | 9,426 | 581,100 | 580,800 | 471,290 | 100 | 123 |
| Total Africa. | 21,828 | 24,163 | 20,236 | 1,091,330 | 1,208,119 | 1,011,808 | 90 | 108 |
| OCEANIA. | | | | | | | | |
| Australia. | 20,724 | 18,437 | 15,933 | 1,040,000 | 921,900 | 796,647 | 112 | 130 |
| Hawaii. | 19,268 | 19,401 | 18,961 | 963,000 | 970,000 | 948,051 | 99 | 102 |
| Fiji Islands. | 2,657 | 2,654 | 2,912 | 132,800 | 132,700 | 145,602 | 100 | 91 |
| Total Oceania. | 42,649 | 40,492 | 37,806 | 2,135,800 | 2,024,600 | 1,890,300 | 105 | 113 |
| TOTALS. | 388,353 | 382,088 | 336,609 | 19,429,670 | 19,112,520 | 16,830,309 | 102 | 115 |

(1) Approximate data.

United States: The production of sugar beets in 1940 is now estimated at 212,980,000 centals (10,649,000 short tons) against 215,460,000 (10,773,000) in 1939 and an average of 179,416,000 (8,971,000) in 1934 to 1938; percentages, 98.8 and 118.7.

Egypt: The formation of internodes was general at the end of August, and early crops were progressing towards maturity. Cutting started in partial areas in few localities for local consumption before full maturation. Crop condition is normal.

CURRENT INFORMATION ON VINES.

Bulgaria: The flowering of vines took place under rather unfavourable conditions. Persistent rains hindered the fight against mildew which is widespread nearly everywhere and has seriously damaged the production of grapes which this year will be under the average. At the beginning of August the ripening of grapes had begun here and there.

Greece: The production of raisins this year appears to be very abundant, and about 25 per cent. above the production last year. This has caused serious preoccupations among producers and exporters owing to the difficulty of finding new markets to compensate, in part at least, the loss of the British market which was the chief consumer.

The area under vines (all vineyards including young vines not bearing) in 1940 is estimated at 621,000 acres against 653,200 acres in 1939 and an average of 637,300 acres in 1934 to 1938; percentages, 95.1 and 97.4.

The correspondent figures of the vines area for must production are as follows: 382,100; 396,400; 374,400; 96.4 per cent. and 102.1 per cent.; for dried raisins: 194,700; 197,500; 190,500; 98.6 per cent. and 102.2 per cent.; for table grapes: 40,500; 47,300; 48,700; 85.7 per cent. and 83.1 per cent. It is interesting to note also the heavy diminution of the area of young vines newly planted and not bearing, which this year is 3,500 acres against 25,700 acres in 1937.

Hungary: On 20th August cold and damp weather was very unfavourable to vines; the development and ripening of bunches had been affected by it and the spreading of peronospora had ravaged the vines. In many vine sections oidium and green rust were causing damages.

Excessive rains have greatly hindered the season work in the vines which were partly invaded by weeds. In many places hail had also done damages. Early grapes were already being sold, but their quality was very poor on account of unfavourable weather conditions.

Portugal: The forecast is for a very poor production of wine. In nearly all the agricultural regions the attacks of brown-rot and vine mildew were particularly widespread.

The production of vine in 1939 is estimated at 169,824,000 Imperial gallons (203,943,400 American gallons) against 240,985,200 (289,401,600) in 1938 and an average of 165,805,600 (199,117,600) in 1933 to 1937, percentages, 70.5 and 102.4.

Romania: The production of vineyards is extremely poor this year, and the forecast is for a crop which will not be over 15 per cent. of the normal.

Yugoslavia: A very cold winter, a rather cold and rainy spring as well as a not altogether warm summer (except in the month of July) have badly affected the normal development of the vines. Frequent rains and sudden changes in the temperature during the month of August seriously hindered the fight against cryptogamic diseases which this year have caused considerable damage. The condition of the vine culture

at the end of August was very varied from one place to another. In the region of Prilorje and in Dalmatia a satisfactory crop can be expected, while in all the other zones of production the crop appears to be bad.

As regards raisins and wine, previous forecasts for a poor crop all over the country as a whole are confirmed. The production will be quite lower than that of last year.

CURRENT INFORMATION ON OLIVES.

Greece: Thanks to less rainy and more sunny weather during the month of August in the olive trees zones, the situation has remarkably improved, and the olive crop at present appears rather good.

Italy: A survey recently made by competent Italian authorities show that, if weather conditions are favourable till the time of the gathering and pests do not cause abnormal damages, the olive production of the 1940-41 season will be only slightly lower than the average. Among the chief zones of production the forecast is for a more or less poor crop in Calabria and Sicily, less than ordinary in Campania, and good in Latium and Liguria.

The production of olive oil in 1939-40 is officially estimated at 6,949,700 centals (92,662,400 American gallons) against 3,864,200 (51,522,400) in 1938-39 and an average of 4,520,700 (60,276,500) in 1933-34 to 1937-38; percentages 179.8 and 153.7.

Portugal: If weather conditions are favourable till the time of the harvest, it is expected that the production of olives will be rather good.

The production of olive oil in 1939-40 is estimated at 1,671,300 centals (22,283,500 American gallons) against 736,400 (9,819,000) in 1938-39 and an average of 1,196,600 (15,955,200) in 1933-34 to 1937-38; percentages, 226.9 and 139.7.

Yugoslavia: Weather conditions in the Spring and Summer have been generally favourable to the olive crop in Dalmatia, and the forecast was at first for a good production. However, the excessive heat in July caused the fall of the fruit in some places, and frequent rains in August caused the spreading of *dacus* and other diseases of the olive trees. Consequently the forecast is now for a not too good production. These unfavourable reports and the heavy demand for oil, which has become scarce on the home markets, have strongly increased the price of this product.

Argentina: Olive gathering in the provinces of La Rioja and Catamarca has been completed with remarkably good results. The production in the province of Mendoza has been poor.

CURRENT INFORMATION ON FLAX.

Hungary: On 20th August the production of flax cultivated chiefly for fibre was considered of a medium size both as to quantity and quality. The threshing of flax cultivated chiefly for seed was progressing.

U. S. S. R.: At the 1st September the harvest of flax in the collective exploitations, where nearly the whole of this product is cultivated, had been completed over 4,129,000 acres—i. e., 93 per cent. of the surfaces sown—while last year, at the same date, the surfaces harvested had been 4,200,000 acres (96 per cent. of the surfaces sown). In the European part of the Union the harvest was well advanced: 99 per cent. of the surfaces sown in Ukraine, 94 per cent. in the central regions and 93

Area and Production of Flax.

| COUNTRIES | † AREA | | | | | † PRODUCTION | | | | | | | |
|-----------|------------------------|------------------------|---|--------------------------|------------------------------|------------------------|------------------------|---|------------------------|------------------------|---|---------------------------------------|----------------|
| | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 and 1934-35 to 1938-39 | % 1940 and 1940-41 | | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 and 1934-35 to 1938-39 | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 and 1934-35 to 1938-39 | % 1940 and 1940-41 | |
| | | | | | | | | | | | | | |
| | ooo acres | | | | 1939 and 1940 = 100 | ooo centales | | | ooo lb. | | | 1939 and 1939/ 1940 = 100 | Aver. = 100 |

Fibre.

| | | | | | | | | | | | | | |
|---------------------------|---------------------------------|---------------------------------|-------|-------|-------|--------------------------------|---------------------------------|--------------------------------|-----------------------------------|------------------------------------|------------------------------------|--------|-------|
| Belgium . . . | 136 | 110 | 68 | 123.0 | 199.1 | ... | 1,031 | 478 | ... | 130,053 | 47,752 | ... | ... |
| Hungary . . . | ^{a)} 12 ^{b)} | ^{a)} 10 ^{b)} | 8 | — | — | ^{a)} 72 ^{b)} | ^{a)} 48 ^{b)} | ^{a)} 32 ^{b)} | ^{a)} 7,180 ^{b)} | ^{a)} 4,822 ^{b)} | ^{a)} 3,163 ^{b)} | — | — |
| Romania . . . | ^{a)} 34 | 30 | 60 | — | — | ^{a)} 122 | 126 | 194 ^{a)} | 12,163 | 12,596 | 19,360 | — | — |
| U. S. S. R. ^{a)} | 4,448 | 4,423 | 5,126 | 100.6 | 86.8 | ... | 13,889 | 12,258 | ... | 1,388,917 | 1,225,757 | ... | ... |
| Estonia . . . | ... | 57 | 66 | ... | ... | ... | 175 | 135 | 195 | 17,527 | 13,482 | 19,489 | 130.0 |
| Lithuania ^{a)} | ^{a)} 235 ^{b)} | ^{a)} 211 ^{b)} | 193 | 111.1 | ... | ... | ^{a)} 629 ^{b)} | 619 | ... | ^{a)} 62,898 ^{b)} | ^{a)} 61,879 ^{b)} | ... | ... |
| Egypt . . . | 10 | 10 | 6 | 102.6 | 162.4 | 84 | 81 | 43 | 8,419 | 8,146 | 4,348 | 103.4 | 193.6 |

Linseed.

| | | | | | | | | | | ooo bushels of 56 lb. | | | |
|----------------------------|-----------------------------------|-----------------------------------|-------|-------|-------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|-------|-------|
| Belgium . . . | 36 | 110 | 68 | 123.0 | 139.1 | ... | 553 | 304 | ... | 987 | 542 | ... | ... |
| Hungary . . . | ^{a)} 20 ^{b)} | ^{a)} 20 ^{b)} | 21 | — | — | ^{a)} 149 ^{b)} | ^{a)} 151 ^{b)} | ^{a)} 121 ^{b)} | ^{a)} 266 ^{b)} | ^{a)} 269 ^{b)} | ^{a)} 216 ^{b)} | — | — |
| Romania . . . | ^{a)} 34 | 30 | 60 | — | — | ... | 115 | 208 | ... | 205 | 371 | ... | ... |
| *U. S. S. R. ^{a)} | ... | ... | 5,809 | ... | ... | ... | ... | 16,254 | ... | ... | 29,025 | ... | ... |
| Estonia . . . | ... | 57 | 66 | ... | ... | ... | 152 | 207 | ... | 271 | 369 | ... | ... |
| Lithuania ^{a)} | ^{a)} 235 ^{b)} | ^{a)} 211 ^{b)} | 193 | 111.1 | ... | ... | 703 | 707 | ... | ^{a)} 1,255 | 1,303 | ... | ... |
| Canada . . . | 397 | 307 | 292 | 129.3 | 135.7 | 1,954 | 1,215 | 717 | 3,490 | 2,169 ^{a)} | 1,281 | 160.9 | 272.4 |
| United States . . | 3,168 | 2,034 | 1,217 | 155.8 | 260.2 | 17,171 | 11,385 | 4,558 | 30,662 | 20,330 | 8,139 | 150.8 | 376.7 |
| India ^{a)} . . . | 3,713 | 3,869 | 3,542 | 96.0 | 104.8 | 10,461 | 9,901 | 9,296 | 18,680 | 17,680 | 16,600 | 105.7 | 112.5 |
| Egypt . . . | 10 | 10 | 6 | 102.6 | 190.4 | 65 | 58 | 45 | 115 | 104 | 81 | 110.8 | 143.0 |
| Argentina . . . | ^{a)} 6,672 ^{b)} | ^{a)} 7,600 ^{b)} | 7,391 | 87.8 | 90.3 | ... | 22,364 | 37,312 | ... | 39,935 | 66,629 | ... | ... |

† The years indicated are those of the harvest, single years referring to the Northern Hemisphere, double years to the Southern.

1) Including the reannexed north zone and Sub-Carpathia. — 2) Including the but excluding Sub-Carpathia. — 3) Territory as at end of 1937. — 4) Not including Bessarabia and Northern Bucovina. — 5) "Dolgunetz" variety grown for linseed and flax. — 6) Former territory. — 7) Approximate figure, not official. — 8) Flax and hemp. — 9) Actual territory. — 10) Total: varieties: Dolgunetz and "Kudriash". — 11) Final report. — 12) Area sown.

per cent. in the northern regions had been harvested. In the Asiatic part the proportion of the surfaces harvested varied from 82 per cent. in Siberia and 42 per cent. in the eastern regions.

Retting this year is going on more slowly than in 1939: at the 1st September only the production of 1,902,000 acres had been retted or dried on the fields (46 per cent. of the harvested surfaces), while last year at the same date the quantity retted or dried on the fields corresponded to the production of 2,561,000 acres (61 per cent. of the surfaces sown).

According to available data over a certain number of zones where the flax crop is important, the yield is generally satisfactory.

In Lithuania, the state of the culture of flax, according to the system of the country, was 2,7 at the 1st August 1940, as against 2,8 at 1st July 1940 and 3,5 at 1st August 1939.

Argentina: Wheather conditions in August were favourable to the flax crops in most districts. According to an official report dated September 3, the condition of the crop towards the end of August varied from good to excellent.

CURRENT INFORMATION ON COTTON.

Bulgaria: Notwithstanding the rather cold weather at the beginning of summer, the cotton crop has grown well. Excessive heat in July, following abundant rains, caused an untimely opening of the bolls. Colder and rainy weather during the first half of August retarded the ripening of cotton. The return of fine weather, sunshine and heat during the latter part of the month improved considerably the condition of the crop. If the weather continues favourable a good yield is expected.

Greece: Contrary to the pessimistic reports which, owing to the adverse weather conditions during spring and the beginning of summer gave the cotton crop as poor, it appears now that cotton production will be rather good and even larger than that of last year.

According to the most recent estimate the area cultivated to cotton this year is about 194,300 acres, against 190,000 in 1939 and 140,600 on the average of the five years ending in 1938; percentages 102.2 and 138.2. The corresponding production of cotton (ginned) is estimated at about 373,000 centals (78,000 bales) against 299,400 (62,600) and 269,100 (56,300); percentages 124.6 and 138.6.

From the same source, the Cotton Institute, the distribution of the area and the production of ginned cotton by zones is as follows:

| | Area acres | Production of ginned cotton | |
|----------------------------------|----------------|--------------------------------|---------------|
| | | centals | bales |
| Attica-Boeotia | 44,500 | 95,200 | 19,900 |
| Phthiotides-Phocid | 25,200 | 39,700 | 8,300 |
| Thessaly | 32,100 | 49,600 | 10,400 |
| Kilkis-Calcidica-Pella | 44,500 | 95,900 | 20,100 |
| Serrès-Drama-Cavala | 19,150 | 34,400 | 7,200 |
| Hevros-Rhodopes | 4,200 | 5,300 | 1,100 |
| Laconia | 8,600 | 18,500 | 3,900 |
| Argolides-Corinthia | 6,800 | 23,200 | 4,800 |
| Lemnos | 4,300 | 4,600 | 1,000 |
| Other regions | 4,900 | 6,600 | 1,400 |
| Total . . . | <u>194,250</u> | <u>373,000</u> | <u>78,100</u> |

U. S. S. R.: Weather conditions during the period of sowings were unfavourable, the growth of the plants was considerably retarded and over the principal zones of the cultivation of cotton diseases and noxious insects were noticed in large numbers. Notwithstanding this, thanks to the farmers' cares good returns are expected nearly everywhere.

At the end of the first decade of September picking had been started in many zones of central Asia.

United States: At the end of August the cotton crop had made good progress nearly everywhere. At the beginning of September it was in a better condition than last year and far above the average. During the first two weeks in September the weather was

favourable to the ripening and opening of the bolls. During the next 10 following days, favourable weather conditions prevailed and the picking as well as ginning were progressing.

On the whole the harvest is one week late, because of late sowings, frequent rains and cold temperature till nearly the end of July. Picking is going on slowly and ginning is about 50 per cent. below the mid-September average.

This is the third consecutive year that harvested cotton acreage has set between 23.8 and 24.4 million acres. This is a big reduction in comparison with the acreage of preceding years, and a return to the conditions prevailing in the last years of last century.

The yield per acre on the contrary is very high and comes immediately after the record yield of 1937, i. e., 269.9 lb. of lint for harvested acre. This is the fourth consecutive year that the yield per acre varies between 236 and 270 lb. of lint. In order to fully appreciate the importance of this fact one has only to consider that the acreage is 14 per cent. less than the average, while production is somewhat higher than the average. This means that, though it has been decided not to sow to cotton more than 4,000,000 acres, the production has exceeded the average by about 60,000 bales. Damages done by the boll-weevil are less than last year and less than average.

Lastly it must be mentioned that this year also production of long-staple cotton in the irrigated States of the West is again greater than last year and above the average.

Summary of the Cotton Reports issued by the Government of the United States, during the cotton season (August 1-July 31).

| | Provisional estimates for dates indicated 1940-41 | Final estimates | | Percent. 1940-41 | |
|--|---|-----------------|----------------------------------|---------------------|----------------|
| | | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 = 100 | Aver. = 100 |
| <i>Report referring to July 1:</i> | | | | | |
| Area in cultivation (acres) | 25,077,000 | 24,683,000 | 29,132,000 | 101.6 | 86.1 |
| <i>Report referring to August 1:</i> | | | | | |
| Area left for harvest (acres) (1) 24,616,000 | (2) 23,805,000 | (2) 28,400,000 | 103.4 | 86.7 | |
| Crop condition (per cent. of normal) 72 | 74 | (3) 71 | — | — | |
| Production (4) 11,429,000 | 11,816,000 | 12,713,000 | 96.7 | 89.9 | |
| Yield of lint per acre, in lb. 222.3 | 237.9 | (3) 198.1 | 93.4 | 112.3 | |
| Cotton ginned to August 1 (5) 32,187 | 137,254 | 107,222 | 23.5 | 30.0 | |
| Cotton ginned to August 16 (5) 169,420 | 357,197 | 341,902 | 47.4 | 49.6 | |
| <i>Report referred to 1 September:</i> | | | | | |
| Area left for harvest (acres) (6) 24,406,000 | (2) 23,805,000 | (2) 28,400,000 | 102.5 | 85.9 | |
| Crop condition (per cent. of normal) 74 | 70 | (3) 62 | — | — | |
| Production (4) 12,772,000 | 11,816,000 | 12,713,000 | 108.1 | 100.5 | |
| Yield of lint per acre, in lb. 250.7 | 237.9 | 198.1 | 105.4 | 126.6 | |
| Cotton ginned to 1 September (5) 606,291 | 1,402,970 | 1,424,427 | 43.2 | 42.6 | |
| Cotton ginned to 16 September (5) 1,804,490 | 3,876,616 | 3,410,335 | 46.5 | 52.9 | |

(1) Area in cultivation on July 1 less the ten-year (1930-39) average abandonment, from natural causes, 1.9 per cent. — (2) Area actually harvested. — (3) Ten-year (1920-38) average. — (4) In bales of 478 lb. net weight and exclusive of linters. — (5) In running bales, counting round bales as half bales and exclusive of linters. — (6) Per cent. of the acreage in cotton on July 1, 1940, which has been, or will be, abandoned, from natural causes: 2.6.

Egypt: By the end of August, maturation of the cotton crop and opening of the bolls were progressing under favourable weather conditions. Picking of early cultivations in Upper Egypt, more particularly in the basin lands, was hastened owing to the Nile flood. It was starting in some areas in Lower Egypt, most of them in Southern Delta, where picking is considered a week earlier than last year. In spite of a certain amount of damaged bolls consequent to water deficiency, more particularly in Lower Egypt, crop condition in general is considered good.

CURRENT INFORMATION ON HEMP.

Hungary: On 20 th of August hemp cultivated chiefly for seed had bloomed. Fields were well supplied. Ripening was nearing. Hemp stems cultivated chiefly for blast were well developed. Cultures were thick: retting and breaking were being attended to.

The production of hemp seed in the old territory including the Northern reembodyed section and Sub-Carpathia, is estimated at 33,000 centals. In 1939, on the territory including the Northern reembodyed section, but excluding Sub Carpathia, the production was 25,600 centals and, during the five-year period 1934-38, on the Hungarian territory at the end of 1937, it attained 18,500 centals.

The corresponding figures of fibre hemp are the following (in centals): 243,600; 245,600; 186,400.

Yugoslavia: The July drought has diminished the chances for an abundant crop of flax, which in fact was even in danger. But the rains in the first part of the month of July considerably improved the situation. The work of retting and breaking are proceeding normally. About the middle of August about 85 per cent. of the flax crop had gone through the retting process and about 6 per cent had already been transformed into scutched hemp.

Owing to export difficulties, the hemp stocks are increasing. While offers on the home markets are rather heavy, the demand remains weak. However, the price of hemp in the country holds rather well, thanks to the temporising policy of the producers.

U. S. S. R.: According to the most recent estimates the surface sown to hemp this year is of about 1,483,000 acres as against 1,329,000 acres in 1939 and an average of 1,543,000 acres in the previous five years: rappings: 111.5 per cent. and 96.1 per cent.

CURRENT INFORMATION ON TOBACCO.

Bulgaria: The planting of tobacco continued till nearly the end of June and was considerably harassed by the cold and rains of the spring. The heat in July caused the untimely blossoming of tobacco and stopped the growth of the leaves which remained rather low. In some places the heat burned the leaves. Conditions improved after the rains at the end of July and the beginning of August. Warm weather and rather rare rains during the latter part of August were very favourable to the gathering and drying of the leaves. A normal tobacco production is expected.

Hungary: On 20th August the vegetation of tobacco plantations appeared beautiful, but it needed sunshine. The harvest had already begun and appeared promising. The tobacco crop this year seems of a good quality.

The production for the old territory including the northern reembodyed section and Sub-Carpathia is estimated at 35,451,000 lb. In 1939, on the territory including the northern reembodyed section, but excluding Sub-Carpathia, the production was 47,434,000 lb. and during the five-year period 1934-38, on the Hungarian territory at the end of 1937, it attained 45,141,000 lb.

U. S. S. R.: The tobacco crop this year is abundant. Particularly good yields are registered in Georgia, Adzerbeidjan, Kirghisia and in the region of Krassnoda with an average yield of 1,250-1,600 lbs. per acre. The production of Makorka appears good in Ukraina and in the regions Riazan, Tomlov and Venoneje.

United States: The production of tobacco in 1940 is now estimated at 1,241,700,000 lb. against 1,848,654,000 lb. in 1939 and an average of 1,294,694,000 lb. in 1934 to 1938; percentages, 67.2 and 95.9.

CURRENT INFORMATION ON HOPS.

Hungary: On 20 th August the picking of the ears of hops was being attended to. The forecast is for a medium yield.

United States: The production of hops in 1940 is now estimated at 39,280,000 lb. against 39,380,000 lb. in 1939 and an average of 40,029,000 lb. in 1934 to 1938; percentages, 99.7 and 98.1.

CURRENT INFORMATION ON OTHER PRODUCTS.

Coffee.

Brazil: The quantity of coffee available in Brazilian ports at July 31, 1940, was 3,571,500 centals, as against 3,388,500 centals at the end of June; 2,740,400 centals are in the port of Santos, 445,300 centals in the port of Rio de Janeiro, 240,300 in the port of Paranaguá and the remaining 145,500 in the other ports.

The surplus stocks of coffee destroyed in Brazil from 1931 to the end of July 1940 amount to 91,928,700 centals, of which 646,000 were destroyed during the month of July of the current year.

Paraguay: The last official report shows that the present condition of coffee-trees promises for the current season a crop of about 220,000 lb., namely an average crop.

Venezuela: The situation of coffee plantations in July was good. According to the latest official report the forecast for this year was for a coffee production rather abundant and of good quality.

Philippine Islands: The coffee crop forecast for the present year is generally satisfactory.

Hawai: The July official report confirms that the coffee production in 1940-41 will be good.

Groundnuts.

Egypt: At the end of August podding of ground nuts was general. Agricultural operations were confined to watering; crop condition was normal.

Colza, Sesame and Soya.

Bulgaria: Winter colza was seriously damaged by the cold winter weather which continued during the spring. At the beginning of summer the cool and rainy weather helped the vegetation of the leaves; but excessive dampness caused lodging and the putrefaction of the lower leaves. The heat of July following the rainy period, caused the spreading of rust. A rather low unit yield is expected.

Hungary: On 20th August the sowing of Autumn rapeseed (new crop) was progressing in some localities; but in most districts only preparatory works were done for Autumn sowings.

The soya crop was generally very satisfactory: in many places it was still blooming. Pods are very well developed, healthy and full. Sunshine is needed for the ripening. A good crop is expected.

The production of soya for the old territory including the Northern reembodyed section and Sub-Carpathia, is 114,600 centals. In 1939, on the territory including the northern reembodyed section, but excluding Sub-Carpathia, the production was 75,200 centals.

Romania: Towards the middle of September the seeding of colza was over.

The sowing of autumn colza were limited to a surface not exceeding 12,000 acres.

CURRENT INFORMATION ON FODDER CROPS.

Germany: Weather conditions were very favourable to the growth of forage beets and a very abundant yield is forecasted.

Bulgaria: Rather rainy weather during the agricultural season this year (except during the month of July) was generally favourable to the growth of grass in the meadows and to pastures. The hay crop appears to be very abundant, but not as good as last year as to quality on account of frequent rains which harassed the harvest and haymaking.

Denmark: Thanks to abundant rains, crop condition of forage plants during August improved somewhat nearly everywhere. But the improvement was limited on account of the cold which has hindered their growth. Altogether general conditions, especially in the Jutland are decidedly below the average. According to the Institute system the conditions of the principal forage crops were as follows:

| | September 1st 1940 | August 1st 1940 | September 1st 1939 |
|--------------------------|-----------------------|--------------------|-----------------------|
| Lucern | 92 | — | — |
| Forage turnips | 93 | 92 | 101 |
| Pastures | 74 | 72 | 101 |
| Forage beets | 96 | 95 | 102 |

The condition of pastures and forage plants at the beginning of September was bad. Even worse were the conditions of artificial meadows.

Hungary: On 20th August the second cut of clover gave a good yield as to quantity, but a poor one as to quality because it had become wet standing or on stubbles.

In many places the third cut had already begun. Clover fields cultivated for seeds were in full bloom. The yield will be satisfactory only here and there; in most regions it will be only fair or poor. The presence of weevils was reported in some places. Clover sown this year was growing very well.

The third cut of lucern was nearly over, and in some places even the fourth cut was going on. The production seemed rather satisfactory, except in places where excessive dampness had caused the decay of a certain amount of the crop. The quality however was very unsatisfactory, because much of the clover was wetted even several times after mowing or cocking, or during the drying of the leaves.

The gathering of spring corn (trémois) was nearly over. The yield was good as to quantity, but mediocre as to quality, because it had become wet after mowing.

Moha was growing vigorously, but more sunshine was needed. Nowwithstanding the cold and rainy weather, maize for fodder appeared to be growing well. The cutting and gathering of the early crops are continuing.

Too frequent rains have seriously affected the first cut of the meadow grass. The growth of the second crop is very vigorous, and yields are good in many sections of the country. Pastures appear very good, grass is of a fine colour, fresh and where it is not covered by water, it furnishes sufficient feed for the cattle.

Forage beets were very healthy: their leaves were beautiful of a green fresh colour, and their roots were well developed. A good crop may be expected in most of the regions.

Sweden: The field hay crop, which at the end of May, on account of the persistent drought, appeared very poor, was even worse in July. Forecasts on the crop of natural meadow grass were not any more favourable. The rains which came after hay making was over, helped the growth of the second crop and the pastures; but it seems that only in some isolated cases a second cut will be possible.

Forage beets were helped by rains which fell in the second part of July and in August, and their state of culture, according to the system of the country, went from 2.8 at the 15th July to 3.1 at the end of August. At the same date in 1939 it was also 3.1.

Pastures have improved remarkably in some regions, while in others they are very scarce.

According to the most recent estimate, the area cultivated to permanent meadow this year is estimated at 830,300 acres against 1,042,800 in 1939 and 1,043,000 on the average of the five years ending 1938; percentages 79.6 and 79.6. The corresponding production is estimated at about 8,205,200 centals (413,300 short tons) against 12,171,800 (608,600) and 11,665,000 (583,200); percentages 67.9 and 70.9.

The condition of the crop of fodder roots and tubercules on 15 August was, according to the system of the Institute 103 (3.1 according to the system of the country) the same as that of last year.

The area cultivated to artificial meadows is estimated at 3,345,900 acres against 3,361,800 in 1939 and 3,403,800 on the average of the five years ending 1938; percentages 99.5 and 98.3. The corresponding production is estimated at 68,711,700 centals (3,435,500 short tons) against 100,748,000 (5,037,300) and 111,213,200 (5,560,600); percentages 68.2 and 61.8.

Yugoslavia: In spite of the drought during the month of July and the rainy weather in the first half of August, the meadows and the clover crop were in fine condition by the middle of the month. The first cut of the meadows is nearly over, with good results. Pastures are also in good conditions.

U. S. S. R.: In Lithuania the state of the forage beets crop was quoted, according to the system of the country, 3.1 at the 1st August, as against 2.5 at July 1 and 3.5 at August 1, last year.

The probable yields of clover and natural meadows are as follows: clover (first year) 30.2 centals per acre (1.5 sh. tons) as against 37.2 (1.9) in 1939; clover (of the second year) 20.6 (1.0) against 28.1 (1.4), and natural meadows 22.7 (1.1) against 30.4 (1.5).

Argentina: The conditions of pastures and artificial meadows in August were very satisfactory.

LIVESTOCK AND DERIVATIVES**PIG POPULATION IN DENMARK. ***

(Thousand head)

| CLASSIFICATION | 1940 | | | | | 1939 | | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Aug. 10 | June 29 | May 4 | March 23 | Febr. 10 | Dec. 30 | Nov. 18 | Oct. 7 | Aug. 26 | July 15 | June 17 | May 6 |
| Boars for breeding. | 16 | 17 | 17 | 18 | 17 | 17 | 17 | 18 | 18 | 18 | 17 | 18 |
| Sows in farrow for first time . . . | 30 | 49 | 71 | 89 | 89 | 80 | 63 | 62 | 65 | 76 | 82 | 111 |
| Othersows in farrow | 137 | 146 | 151 | 165 | 169 | 162 | 176 | 189 | 192 | 171 | 163 | 160 |
| Sows in milk . . . | 73 | 90 | 101 | 88 | 80 | 95 | 86 | 81 | 85 | 99 | 101 | 81 |
| Sows not yet covered (and not for slaughter) . | 41 | 34 | 26 | 24 | 25 | 21 | 24 | 25 | 27 | 27 | 23 | 20 |
| Sows for slaughter. | 18 | 15 | 17 | 16 | 12 | 12 | 15 | 15 | 9 | 10 | 9 | 9 |
| Total sows | 299 | 334 | 366 | 382 | 375 | 370 | 364 | 372 | 378 | 383 | 378 | 381 |
| Sucking pigs not weaned | 617 | 756 | 807 | 734 | 662 | 804 | 735 | 696 | 731 | 841 | 862 | 684 |
| Young and adult pigs for slaughter: | | | | | | | | | | | | |
| Weaned pigs under 35 kg. . . . | 850 | 839 | 690 | 712 | 769 | 749 | 732 | 767 | 839 | 771 | 660 | 657 |
| Pigs of 35 and under 60 kg. . . | 690 | 628 | 628 | 686 | 659 | 657 | 697 | 766 | 663 | 641 | 589 | 571 |
| Fat pigs of 60 kg. and over . | 519 | 625 | 626 | 534 | 558 | 537 | 685 | 573 | 535 | 473 | 491 | 443 |
| Total pigs . . . | 2,991 | 3,199 | 3,134 | 3,066 | 3,040 | 3,134 | 3,230 | 3,192 | 3,164 | 3,127 | 2,997 | 2,754 |

* Rural districts.

WORLD PRODUCTION AND TRADE OF HONEY AND BEESWAX

The importance of the two products of bee-keeping, honey and wax, has considerably declined in the course of time. As late as in the Middle Ages, honey was still the only means of sweetening food. It has since lost all importance in this respect. It is chiefly used nowadays for spreading upon bread; as such a condiment, it has, however, kept a good place, owing to its pleasant taste and salubrity. Besides, it is being used in various manners in the production of food-stuffs. The taste of honey varies to a large extent according to the kind of plants from which it is derived. Beeswax has been superseded by other waxes, and even by other stuffs, in a still larger measure. It is not indispensable for any industrial purpose. Wax obtained from flax powder resembles it most; it is used e. g. for the making of boot-polish. Next to waxes of vegetal

origin, we have to mention those made from coal and tar. In the making of candles, stearin has nearly altogether superseded beeswax, and the Church alone has maintained wax candles in its services. Owing to the large offer of waxes of all kinds, the price of beeswax has decreased, and this fact, together with technical changes in the methods of apiculture, has caused a considerable decline in its production. Apiculture is its principal consumer.

We may mention besides, as a product of bee-keeping, bee-toxin, a remedy against rheumatism, with which, however, we have not to deal here.

Although honey and wax have lost most of their former importance, it can be said that bee-keeping is more appreciated nowadays than it ever was before, especially by agriculture and gardening, since the part taken by the bees in pollination of useful plants has become better known. Besides, it is recognised that bees protect, in a manner which has not been thoroughly accounted for so far, fruit blossoms against damage done by late frosts. It is thought that, after having been pollinated by bees, blossoms become less sensitive to frost. Anyhow, it is affirmed that the services bees render by pollinating blossoms vastly exceed the value of the production of honey and wax.

The extent of bee-keeping and its development from year to year depend upon various factors. More than the price of honey and wax, meteorological conditions, the prevailing of diseases and the price of the sugar used as additional food for bees in winter time are elements decisive for the increase or the decline of the stocks in the bee-hives.

Number of beehives.

The figures in the table contain all available data. Nearly all principal countries are included, and there are also figures for certain other countries where beekeeping is but little developed. Not all countries number yearly their bee-hives or the production of the latter. In many cases, there can be obtained only such figures as result from censuses taking place at long intervals, e. g. every ten years, or in an irregular manner. Generally speaking, the figures given here ought to be used with some caution, on account, not only of divergencies from one country to another, but also of the inaccuracy due to the relative smallness of the subject considered. Besides, as is the case with any kind of animals, the census results are influenced by the date of numbering, by reason of the fluctuations due to the season of the year.

If we rank the different countries according to the size of their hive stocks as given in the table, we obtain the following order. The Union of S. S. R., the United States, Germany, France, Mexico and Turkey have stocks exceeding one million of bee-swarms. Former Czecho-Slovakia, Yugoslavia, Greece, Italy, and Roumania show figures ranging between half a million and one million. Former Austria, Bulgaria, Portugal, Hungary and Canada had, according to their respectively latest figures, stocks above 400 000 swarms. Then follow, with stocks descending from 400,000 to 100,000 swarms, Egypt, Switzerland, Argentina, Latvia, Australia, Lithuania, Sweden, Chile, New Zealand and Esthonia. The other countries included in the table show only smaller figures.

Number of beehives.

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|--|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| Germany | (¹)2,810,000 | 2,569,068 | 2,467,899 | 2,503,449 | 2,129,397 | 2,002,884 | 2,101,788 | 1,915,570 | 1,872,056 |
| Austria | — | 456,600 | — | — | — | 407,610 | — | — | (²) 290,981 |
| Bulgaria | a) . . . | . . . | . . . | . . . | . . . | 441,864 | — | — | (²) 324,233 |
| | b) . . . | . . . | . . . | . . . | . . . | 302,067 | 257,672 | 224,025 | — |
| Belgium | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 58,520 |
| Estonia | 105,990 | 103,940 | 102,100 | 74,100 | 65,900 | 59,480 | 54,240 | 51,160 | 49,140 |
| Finland | . . . | 18,651 | 18,374 | 15,420 | 13,325 | 12,993 | 13,021 | 13,028 | 13,405 |
| France | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 1,310,000 |
| Greece | . . . | 697,071 | 712,001 | 682,736 | 515,937 | 596,184 | 595,758 | 519,263 | 585,893 |
| Hungary | . . . | . . . | 410,909 | 410,385 | 357,039 | 330,701 | 308,191 | 268,861 | 252,499 |
| Ireland | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 14,811 |
| Italy | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 632,325 |
| Latvia | 222,460 | 191,791 | 188,829 | 169,400 | 163,900 | 136,600 | — | — | (⁴) 85,020 |
| Lithuania | 167,880 | 174,390 | 162,350 | — | — | — | — | — | — |
| Luxemburg | 14,422 | — | 12,236 | — | — | 12,449 | — | — | 10,822 |
| Norway | 38,790 | — | — | — | — | — | — | — | (⁴) 22,150 |
| Netherlands | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 86,326 |
| Portugal | . . . | . . . | . . . | . . . | 445,132 | — | — | — | — |
| Rumania | . . . | 588,298 | 578,513 | 562,371 | 551,159 | — | — | — | — |
| United Kingdom:North- ern Ireland | . . . | 2,294 | 3,198 | 5,294 | 4,580 | 3,932 | 3,705 | 4,049 | 3,760 |
| Sweden | . . . | . . . | . . . | . . . | . . . | . . . | . . . | 139,483 | — |
| Switzerland | 330,000 | 328,000 | 337,000 | 336,495 | 326,000 | 320,000 | 312,000 | 306,000 | 300,444 |
| Czechoslovakia | c) . . . | — | 760,358 | 689,758 | 643,609 | 615,324 | 569,012 | 538,182 | 538,925 |
| | d) . . . | — | 868,613 | 895,555 | 736,083 | 727,669 | 663,945 | 646,115 | 629,609 |
| Yugoslavia | 792,885 | 803,322 | 811,738 | 782,468 | 749,409 | 718,668 | 670,963 | 628,758 | 623,277 |
| U. S. S. R. | . . . | 8,064,600 | — | — | — | — | — | — | (⁴) 5,036,400 |
| Canada | 406,050 | 394,035 | 386,400 | 370,800 | — | — | — | — | 279,453 |
| United States | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴)(⁵)3,107,755 |
| Hawai | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 14,557 |
| Virgin Islands | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 412 |
| Puerto Rico | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 24,444 |
| Guatemala | . . . | 35,109 | — | 25,856 | 23,617 | 18,419 | 23,694 | 19,807 | 26,570 |
| Mexico | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 1,318,111 |
| Argentina | . . . | . . . | 245,116 | — | — | — | — | — | (⁴) 89,208 |
| Chile | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 114,292 |
| Uruguay | . . . | . . . | 50,226 | — | — | — | — | — | (⁴) 53,409 |
| Japan | . . . | 189,696 | 204,029 | 201,220 | 210,417 | 209,240 | 196,483 | 196,572 | 186,363 |
| Syria and Lebanon | . . . | . . . | . . . | . . . | . . . | 45,800 | 34,700 | 37,390 | 50,860 |
| Turkey | . . . | 1,270,231 | 1,133,590 | 1,161,560 | 1,104,088 | 1,068,314 | 946,807 | — | 985,889 |
| Algeria | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 136,390 |
| Egypt | . . . | . . . | . . . | . . . | . . . | . . . | . . . | . . . | (⁴) 349,337 |
| Union of South Afrika e) | . . . | . . . | 71,266 | — | — | — | — | — | (⁴) 74,067 |
| Australia e) | . . . | 225,168 | 232,155 | 263,538 | 216,323 | 148,538 | 179,180 | 124,987 | 135,490 |
| New Zealand | 116,175 | 111,513 | 125,573 | 140,632 | 121,700 | 115,568 | 118,632 | 103,529 | 110,634 |

a) census. — b) Beehives belonging to the farmers. — c) In the spring. — d) In the fall. — e) Productive beehives.

(¹) In the Great Germany: 3,546,000. — (²) 1930. — (³) 1926. — (⁴) 1929. — (⁵) 1928. — (⁶) See explanations in the text. — (⁷) 1927.

In the country where bee-keeping is most spread, the Soviet Union, it may be noticed, in the course of the last ten years, a surprising increase. However, it cannot be said to what extent the figures given for that period are typical, especially whether the years covered by them were not exceptional ones.

In the United States, the figures refer only to the bee-hives on farms. Thus it seems likely that they leave out a large part of existing stocks. The figure for 1930 is really lower than the one for 1939 in Greater Germany, but, as it may be believed that an increase has taken place in the United States as well, we are inclined to think that the latter continue to keep the second place. The development of apiculture was there, according to agricultural censuses, as follows:

| | |
|----------------|------------------|
| 1900 | 4,108,239 swarms |
| 1910 | 3,445,006 " |
| 1920 | 3,467,396 " |
| 1930 | 3,107,755 " |

The decrease in swarms shown by the figures given above may perhaps be explained by a shifting of bee-keeping towards non-agricultural establishments.

It is to be observed that the production of honey shown in the following table does not cover the totality of hives. The farms which have supplied figures for their production of honey contained, in 1930, 2,666,282 hives, against 2,537,547 numbered in 1920. Apparently, statistical methods have been improved meanwhile.

In Germany we find an increase of total figures almost uninterrupted since 1925, when there had been numbered 1,550,822 swarms. Only the year 1930 proved an exception in this respect, as, on account of temporary subsidies granted the number of swarms reached then of a sudden the same level as afterwards in 1934. The increase, due to a gradual improvement of the economic conditions of apiculture, was, from 1925 to 1939, of about 81 per cent. For Greater Germany, there was assumed, in 1939, a stock of 3,538,916 swarms. An equally important increase results from the few data available for former Austria.

Of the three countries with over one million swarms, Turkey alone has published annual estimates, which show a constant and notable increase. The figures supplied for France and for Mexico refer to the situation reported ten years ago, i. e. at a time when Turkey did not even count 800,000 swarms. It is possible, but hardly likely in the case of France, that apiculture has also progressed in these two countries, and may still be more important there than in Turkey.

In nearly all other countries, the increase in bee-keeping has been so general that it is hardly necessary to examine them one by one. But, we may notice that, apart from some changes from one year to another, there has been no notable progress either in Japan or in New Zealand.

On the whole, the survey shows that stocks of bee-swarms have as a rule increased to a large extent in the course of the last ten years. In the

case of countries where a comparison is in some measure possible, this increase has been of about half the amount of the stocks existing at the beginning of the period in question. Now, what deserves to attract attention is, not only the extent of the increase, but also its uniformity, which is the more striking as the conditions were altogether unlike in the various countries.

Spread of the movable structure.

Next to the numerical increase of bee-swarms, it is to be noticed the progress realised in the use of modern forms of exploitation. In primitive conditions, an excavated tree trunk, a basket, or some other stuff the simple nature of which is often surprising, serves as a dwelling for the bees. In order to be harvested, the honeycombs built by the bees have to be broken and so removed. This form of exploitation is called a stable structure.

Number of beehives with movable frames in % of the total.

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|----------------------------------|--------|------|------|------|------|------|------|------|----------|
| Germany | ... | ... | 79.5 | 77.7 | 75.4 | 74.8 | 73.8 | 72.8 | 72.0 |
| Austria | — | — | — | — | — | — | — | — | (1) 60.5 |
| Bulgaria | a) ... | ... | ... | ... | ... | 48.9 | — | — | (2) 35.6 |
| | b) ... | ... | ... | ... | ... | 54.1 | 55.1 | 45.0 | — |
| Estonia | ... | ... | ... | ... | ... | ... | ... | ... | (2) 79.9 |
| France | ... | ... | ... | ... | ... | ... | ... | ... | (2) 44.9 |
| Greece | ... | 10.2 | 8.8 | 7.3 | 6.6 | 5.9 | 5.2 | 4.2 | 3.6 |
| Hungary | ... | ... | 85.0 | 80.3 | 82.9 | 82.5 | 78.3 | 79.3 | 78.5 |
| Portugal | ... | ... | ... | 2.8 | — | — | — | — | — |
| Romania | ... | 56.3 | 50.4 | 49.7 | 47.7 | — | — | — | — |
| United Kingdom: Northern Ireland | ... | 90.9 | 91.4 | 90.8 | 91.2 | 91.4 | 91.6 | 93.5 | 91.3 |
| Switzerland | ... | ... | ... | 96.7 | — | — | — | — | 95.1 |
| Yugoslavia | 45.7 | 44.3 | 41.5 | 42.0 | 39.3 | 37.0 | 34.7 | 33.0 | 33.4 |
| U. S. S. R. | ... | ... | ... | ... | ... | ... | ... | ... | (1) 54.8 |
| Argentina | ... | ... | 50.3 | — | — | — | — | — | — |
| Egypt | ... | ... | ... | ... | ... | ... | ... | ... | (2) 1.0 |

(a) According to the census. — (b) Beehives belonging to the farmers. — (c) Improved beehives.

(1) 1930. — (2) 1926. — (3) 1929.

About the middle of the last century, apiculture began to use movable honeycombs, also called exchangeable frames: small frames, which were put into the hives, the latter being already built according to various systems. It is what is called a movable structure. Such a structure allows the bee-keeper to influence, by a proper handling, the life in the hive in the sense which is desired. It is useless to examine here the advantages and the results of the use of exchangeable frames. For the purposes of the statistical enquiry, it is, however, of importance to notice that the structure of hives with movable frames

often varies to a large extent. There are, besides, more modern forms of the stable structure, e. g. wickerwork hives. Thus it may appear doubtful whether the statistical results have in fact a sufficiently uniform base. Of course, much depends upon the manner in which questions are put in the census forms. Anyhow, great caution is to be taken when comparing figures for different countries.

Notwithstanding such reserves, it is after all possible to draw some conclusions of a general character from the data supplied as to the number of hives with movable frames. The number of countries which supply data in the matter is by no means a large one, and, besides, it includes States with but an unimportant apiculture, such as Northern Ireland. Yet, although the number of these countries is limited, the uniform tendency of the respective development allows of a certain generalisation of the results. It is not necessary to reproduce here the absolute figures of hives with movable frames, and are only given in the table the respective percentages, which show more clearly the evolution that has taken place in each case. Although the movable honeycomb has been generally known for nearly a century, the increase of its spread has been only a very large one in the course of the last ten years. This fact can be noted in the case of all countries for which there are available data extending over a number of years, such as Germany. Instead, a decrease in the use of movable honeycombs could only be found in altogether exceptional cases. The divergences among the different countries as to percentages and as to the average level, which is sometimes rather striking, are in part to be explained by the peculiarities of statistics already mentioned above.

As a conclusion of this short survey on apiculture, it may be said that a very considerable increase of stocks has generally taken place of late. Even more important than this numerical increase has been the adoption of modern methods of exploitation; thus existing stocks have been modernised to a larger extent than new bee-swarms formed. It must be noticed, besides, that the evolution has proved in a wide measure uniform, notwithstanding the very different conditions in the various countries.

Production of honey.

The figures relating to the production of honey show only in part the increase which could be expected, given the general expansion of stocks and the adoption of the movable structure. It is true that the yield of honey is not exclusively determined by the number of bee-swarms, but is also influenced by other factors, such as weather conditions, which influence the state of the flowers and blossoms supplying food to bees and of the bee-swarms themselves, as well as by the appearance of diseases. These factors are no doubt of the highest importance. Besides, there is the question whether statistical figures have always been able to keep pace with the production, especially whether they have not maintained without change data once supplied by a bee-keeper, although the production of the latter had increased since. Yet, the fact is not

to be denied that a large number of countries show an increasing tendency in their production of honey. And, if a sufficiently clear line of development is wanting in the table, this fact is due to the lack of uniformity in the results from one year to another.

The largest production is that of the Soviet Union. If the yield per hive was smaller there in 1938 than e. g. in the United States in 1929, it must not be forgotten the fluctuations in the returns from year to year.

Production of honey.

(ooo lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|----------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Albania | ... | 441 | — | 507 | 485 | 474 | — | — | (*) 472 |
| Germany | (*) 63,714 | (*) 41,447 | (*) 51,588 | (*) 46,959 | (*) 45,636 | (*) 51,147 | (*) 36,156 | (*) 39,242 | (*) 27,117 |
| Austria | ... | ... | ... | ... | ... | ... | ... | ... | (*) 3,745 |
| Bulgaria | ... | ... | ... | ... | ... | 5,291 | 5,272 | 4,188 | — |
| Estonia | 1,371 | 1,489 | 1,461 | 1,095 | 712 | 905 | 933 | 869 | 584 |
| France | ... | 13,239 | 17,238 | 16,854 | 17,992 | 19,315 | 15,234 | 17,163 | (*) 25,829 |
| Greece | ... | 7,763 | 8,391 | 9,435 | 5,254 | 7,150 | 7,555 | 5,604 | 6,860 |
| Hungary | ... | ... | 6,791 | 6,757 | 3,325 | 5,743 | 3,478 | 4,949 | 3,910 |
| Ireland | ... | 168 | 246 | 246 | — | — | — | — | (*) 173 |
| Italy | ... | ... | ... | ... | ... | ... | ... | ... | (*) 5,105 |
| Latvia | 4,697 | 6,464 | 5,531 | 7,037 | 2,115 | 3,595 | 3,122 | 2,779 | 2,493 |
| Lithuania | (*) 2,403 | — | — | — | — | — | — | — | — |
| Luxemburg | ... | ... | 200 | — | — | 278 | — | — | 159 |
| Norway | ... | ... | ... | ... | ... | ... | ... | ... | (*) 529 |
| Portugal | ... | ... | ... | ... | 2,646 | ... | ... | ... | — |
| United Kingdom: Northern Ireland | ... | 26 | 54 | 125 | 105 | 80 | 70 | 44 | 72 |
| Switzerland | 2,110 | 7,665 | 2,452 | 1,706 | 4,513 | 7,196 | 6,054 | 2,496 | 5,631 |
| Czechoslovakia | ... | ... | 9,984 | 9,170 | 7,702 | 8,328 | 4,766 | 5,587 | 5,155 |
| Yugoslavia | 8,051 | 10,333 | 9,646 | 10,628 | 9,465 | 13,000 | 8,605 | — | — |
| U. S. S. R. | ... | 112,436 | 112,436 | — | — | — | — | — | — |
| Canada | 28,856 | 37,910 | 23,196 | 31,938 | 26,815 | 27,063 | 25,288 | 21,169 | 25,160 |
| United States | ... | ... | ... | ... | ... | ... | ... | ... | (*) 83,546 |
| Guatemala | ... | 1,255 | — | 2,576 | 3,190 | 1,677 | 3,036 | 1,862 | 1,430 |
| Argentina | ... | ... | 9,398 | — | — | — | — | — | (*) 10,072 |
| Chile | ... | ... | ... | ... | ... | ... | ... | ... | (*) 3,746 |
| Uruguay | ... | ... | 862 | ... | ... | ... | ... | ... | (*) 733 |
| Japan | ... | 5,854 | 6,226 | 5,555 | 5,693 | 5,782 | 5,242 | 4,878 | 4,401 |
| Syria and Lebanon | ... | 222 | 300 | 244 | — | — | — | — | — |
| Turkey | ... | 10,390 | 11,423 | 11,598 | 9,567 | 11,313 | 9,272 | — | 9,962 |
| Algeria | ... | ... | ... | ... | ... | ... | ... | ... | (*) 1,102 |
| Egypt | ... | ... | ... | ... | ... | ... | ... | ... | (*) 1,480 |
| Union of South Africa | ... | ... | 11,144 | ... | ... | ... | ... | ... | (*) 981 |
| Australia | ... | 12,583 | 11,907 | 16,385 | 14,125 | 6,492 | 12,356 | 6,111 | 8,476 |

(*) Census.

(1) 1927. — (2) Calculated figures. — (3) 1929. — (4) 1928-29. — (5) 1928. — (6) 1929-30. — (7) 1930. — (8) On the farms.

As to the amount of honey given in the table as the production of the United States, it is to be noticed that the numbering in question is by no means complete. In fact, apart from the bee-keepers who have been ignored by sta-

tistics, there are lacking data as to the production of honey of some 138 000 farmers not reporting their honey outturn with about 441 500 bee-swarms. The total farm production of the United States could be estimated, on the base of the general average for 1929, to have been of 97,004 thousand lb. The proportion of the farm production which was not covered by statistics seems to have been still larger in the former censuses (55 226 thousand lb. in 1919, and 94,498 thousand lb. in 1909).

In the case of Germany, official data are altogether lacking as to the production of honey. The figures given in the table have been calculated in the Institute upon the base of data supplied by the professional organisation (Reichsfackgruppe Imker). The fluctuations in the return are due to the great differences in the yield, which oscillated between 14.3 lb. and 25.6 lb. per hive.

Particularly large, as compared with the number of bee-hives, is the production of honey in Canada. While the latter country occupies, according to the number of its swarms, but the sixteenth place among the countries included in the table, it figures in the fourth place according to the production of honey. It exceeds even the production of France, a country which is by far ahead as to the number of swarms. The divergence is still more considerable in respect of Turkey, while no data are available for Mexico.

Contrary to her insufficient data as to beehives, France has published figures as to her production of honey. Yet, it is by no means certain that the data for 1929 can be compared with those from 1932. The figures give the impression that production is decreasing.

Production of honey in Australia shows particularly large fluctuations. The average for the years 1931 to 1938 is hardly of 11,023 thousand lb. In consequence, the amounts produced in 1937 and 1938 seem to represent a fair average.

Turkey, Yugoslavia, former Czecho-Slovakia, Argentina and Greece show each a production of nearly the same order. Here again, some years strikingly diverge from the normal level. On the contrary, the production of Japan remains stable within relatively constant limits. An important increase has taken place, notwithstanding some setbacks, in the production of Latvia, which reached its highest point in 1936.

The number of countries producing honey is by no means exhausted by those shown in the table. For certain of these other countries, foreign trade statistics supply some data as to the size of their production of honey. The most important of these countries is Cuba, the yearly export of honey of which recently exceeded 13,228 thousand lb.

Production of wax.

The other product of apiculture, wax, has lost even much more of its former importance than honey. As already mentioned, there are many similar stuffs of another origin, which render beeswax unnecessary. The depreciation

of wax which followed took place at the same time as a decrease in the production of beeswax. In fact, the latter has diminished since movable honeycombs were adopted, and the decrease proved even more considerable after the frames had begun to be provided with artificial internal partitions or even with ready made artificial honeycombs. Thanks to such an arrangement, the bees are enabled to start immediately collecting honey, without having to waste time, strength and work in building their dwelling. Now, while the production of honey increases in consequence, that of wax diminished necessarily. A new swarm is at first no producer, but simply a consumer, of wax, and it takes some time before it is able to produce wax itself. Thus the rather peculiar state of things has resulted that apiculture has become itself the chief consumer of beeswax, the more so as wax is often wasted when building the internal partitions.

The diverse proportion of the quantities obtained of the two products of apiculture is also reflected in statistics. Thus, for France, it results that, in 1920, there were obtained, from hives with movable honeycombs, 459 thousand lb of wax and 16,233 thousand lb. of honey, and, from other hives, 302 thousand lb. of wax and 9,597 thousand lb. of honey. The difference is a very considerable one: in the first case, there were, for each quintal of wax, 7.8 thousand lb. of honey, and in the other one, instead, only 2.3 thousand lb.

A good example of the manner how the proportion in the production is shifting, in the course of a sufficiently long time, after movable frames have been adopted, is supplied by the decennial agricultural censuses of the United States for the period going from 1859 to 1919 (the production of wax not having been, unfortunately, enquired into in 1929). Here the whole production of bee-keeping is resumed under one total. Thus the figures show how the final result has been modified by the change in the methods of exploitation. The censuses made during the said period have shown a proportion of wax to honey of 1 : 17.7 in 1859, of 1 : 23.3 in 1869, and in 1879, of 1 : 54.8 in 1889, of 1 : 60.6 in 1909 and of 1 : 67.3 in 1919. According to data reproduced in literature (1), there seems to have been ascertained in California, in 1930, a proportion of 1 : 83. This relation corresponds to the amount of "opening wax", i. e. of wax which has to be broken away in order to allow the honey to be swinged. But this proportion of yield as an average result of a rather vast territory, is really in no relation of immediate causality with the amount of "opening wax". It simply expresses the fact that the production of wax has lost all importance in comparison with that of honey, and that most bee-keepers are no longer wax producers.

The relative or even absolute decrease in the production of wax, such as took place *e. g.* in the United States in the course of a period of 70 years, could hardly be put in evidence within such a short time as the one to which refers the table.

(1) Armbruster, "Imkerei-Betriebsformen", Berlin, 1936, p. 148.

The largest producer of wax is again the Soviet Union. Its yearly production is as large as that of the next following three States—France, Portugal and Turkey—taken together, from which the figures supplied for Portugal can only be considered a rough approximation. Of late, and especially in the course of the years 1937 and 1939, Yugoslav production has been slightly in excess of that of Turkey.

In the United States, the farm production of wax was, according to censuses, of 1,763 thousand lb. in 1899, of 895 thousand lb. in 1909 and of 821 thousand lb. in 1919. We have been unable to obtain more recent data, but, considering what has been said above, one would have to reckon rather with a further decrease than with an increase of production. In any case, it may be assumed that the production of wax in the United States is smaller than that of Turkey.

Production of wax.

(1000 lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|----------------------------------|------|-------|-------|-------|-------|-------|-------|---------------------|-------|
| Albania | ... | 71 | — | 77 | 72 | 68 | — | — ¹⁾ | 66 |
| Germany: Austria | ... | — | — | — | — | — | — | — ²⁾ | 200 |
| Bulgaria | ... | — | — | — | — | 198 | 252 | 176 | — |
| France | ... | 2,436 | 2,829 | 2,326 | 2,504 | 2,992 | 2,694 | 2,341 ³⁾ | 1,801 |
| Greece | ... | 634 | 732 | 868 | 579 | 806 | 818 | 710 | 860 |
| Hungary | ... | — | 106 | 122 | 79 | 142 | 115 | 103 | 93 |
| Italy | ... | — | — | — | — | — | — | — ⁴⁾ | 455 |
| Latvia | ... | — | — | — | 238 | 180 | 200 | 201 | 267 |
| Luxemburg | ... | — | 32 | — | — | 44 | — | — | — |
| Portugal | ... | — | — | — | 2,205 | — | — | — | — |
| United Kingdom: Northern Ireland | ... | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 |
| Czechoslovakia | — | — | 418 | 329 | 373 | 406 | 322 | 324 | 313 |
| Yugoslavia | 934 | 1,188 | 1,177 | 1,206 | 1,090 | 1,254 | 792 | — | — |
| U. S. S. R. | — | 5,688 | 5,291 | — | — | — | — | — | — |
| Canada | 351 | 463 | 287 | 343 | 296 | 297 | 286 | — | — |
| Guatemala | ... | 246 | — | 101 | 94 | 61 | 157 | 110 | 40 |
| Argentina | ... | — | 406 | — | — | — | — | — | — |
| Chile | ... | — | — | — | — | — | — | — ⁴⁾ | 392 |
| Japan | ... | 56 | 56 | 56 | 63 | 58 | 52 | 53 | 55 |
| Syria and Lebanon | ... | 56 | 84 | 70 | — | — | — | — | — |
| Turkey | ... | 1,164 | 1,158 | 1,328 | 1,218 | 1,290 | 867 | — | 1,178 |
| Algeria | ... | — | — | — | — | — | — | — ⁵⁾ | 298 |
| Australia | ... | 174 | 171 | 197 | 169 | 93 | 153 | 82 | 104 |

(*) Census.

(1) 1927. — (2) 1929. — (3) 1928. — (4) 1929-30. — (5) 1930.

and Yugoslavia. It would be very difficult to estimate its proportion to that of Greece, where very considerable fluctuations take place in the yearly yields, and to that of Italy, where data are available only far 1929.

With a production ranging from 220 to 440 thousand lb. are represented in the table former Czecho-Slovakia, Canada, the Argentine, Chile and Algeria.

The production of wax has reached, in some isolated cases, the same level, also in Bulgaria, Latvia and Guatemala. Similarly, the data for former Austria approached that level in 1929.

Besides other countries with a smaller production which we have been able to include in the table, there is a number of States—having perhaps a large, production of wax as to which nothing could be said here, no data whatever being available in their case. Germany is one of these States. This deficiency in the statistics can be in some measure explained by the relatively small importance of wax production. Here again, certain blanks may be filled by recurring to foreign trade figures.

Principal producers and exporters of wax are above all African countries, especially Angola and the various French possessions in Africa. In that part of the world, wax is often obtained, not by means of a regular bee-keeping, but by a kind of wax hunting.

International trade in honey.

In the following remarks upon international commerce account is taken only of countries which have a trade of some importance in honey and wax. A large number of other countries have a smaller share in the imports or exports.

As to honey, figures in foreign trade statistics refer mostly to bee-honey alone. Only in a few cases, artificial honey is included under the same heading. In the case of certain countries, such as the United Kingdom, where the heading reads simply "Honey", and not "Bee-honey", while artificial honey is not otherwise mentioned, we may assume it as probable that the latter is comprised in the respective figures.

Very considerable are the differences from one year to another in the amounts exported. By far the largest exports are those of Cuba, where the quantities exported vary very much indeed, the difference between 1934 and 1935 being particularly striking. The second place is taken by Chile, whose much smaller exports fluctuate again very much from one year to another, Mexico has been able of late substantially to increase its exports. The evolution has been very similar in Canada, and has resulted in nearly the same figures as in Mexico being reached there, so that these two countries take respectively the third and the fourth place among the exporters of honey. The United States, which follow with the next largest amounts, have been able to exceed by far, in the course of the last years, their particularly low exports of 1936, but the figures in question remain still considerably below those registered in former years, especially in 1933, when there was reached an amount such as Chile, which takes the second place, only could show in its best year, 1936. Of a more or less similar order as those of the United States during the last years are the exports of Guatemala and, in some years, those of Argentina, where, however, fluctuations are particularly striking, even when compared with the other countries mentioned above. Other big exporters of honey are Jamaica and the Domi-

Honey - Exports.

(in 1,000 lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|--------------------------------------|-------------------|---------------------|---------------------|---------------------|-------------------|---------------------|---------------------|---------------------|-------------------|
| Spain | ... | ... | ... | ... | 48 | 270 | 258 | 411 | 333 |
| France | ... | 1,357 | 985 | 1,063 | 982 | 1,220 | 1,563 | 1,233 | 1,548 |
| Hungary | 825 | 605 | 1,639 | 932 | 765 | 898 | 764 | 502 | 578 |
| Canada | 4,707 | 4,008 | 2,756 | 2,839 | 2,056 | 1,837 | 2,807 | 2,298 | 2,589 |
| United States | 2,561 | 3,441 | 2,543 | 1,127 | 1,580 | 1,950 | 6,158 | 4,720 | 4,183 |
| Costa Rica | ... | 486 | 535 | 444 | 446 | 433 | 414 | 297 | 263 |
| Cuba | ... | 14,366 | 14,743 | 11,410 | 14,240 | 8,648 | 10,507 | 11,521 | 11,073 |
| Guatemala | ... | 2,594 | ... | ... | 1,747 | 1,383 | ... | 2,071 | ... |
| Haiti | ¹⁾ 871 | ¹⁾ 878 | ¹⁾ 923 | ¹⁾ 1,052 | ¹⁾ 896 | ¹⁾ 1,147 | ¹⁾ 1,174 | ¹⁾ 1,248 | ¹⁾ 713 |
| Jamaica | 1,384 | 1,866 | 2,022 | 1,631 | 1,872 | 1,623 | 1,519 | 2,049 | 1,879 |
| Mexico | ... | 4,372 | 3,900 | 2,713 | ... | ... | 1,840 | 1,234 | 955 |
| Puerto Rico ⁽²⁾ | 1,325 | 1,144 | 1,290 | 1,459 | 1,244 | 1,038 | 1,370 | 886 | 870 |
| Dominican Republic | 874 | 1,725 | 1,448 | 2,054 | 1,556 | 1,963 | 1,094 | 1,501 | 1,224 |
| Salvador | ... | ... | 272 | ... | 90 | 154 | 136 | 131 | 32 |
| Argentina | 165 | 2,048 | 648 | 1,227 | 2,402 | 8 | 63 | 212 | 19 |
| Chile | 1,195 | 5,351 | 4,207 | 6,167 | 4,031 | 3,839 | 2,468 | 5,225 | 2,909 |
| Dutch Guiana | ... | 173 | 122 | 103 | 89 | 79 | 78 | 34 | 7 |
| China | 277 | 233 | 179 | 199 | 121 | 107 | 83 | 156 | — |
| French West Africa | ... | 942 | 952 | 1,175 | 1,217 | 2,163 | 3,547 | 1,179 | 615 |
| Australia | ¹⁾ 687 | ¹⁾ 1,365 | ¹⁾ 1,934 | ¹⁾ 763 | ¹⁾ 389 | ¹⁾ 352 | ¹⁾ 407 | ¹⁾ 252 | ¹⁾ 138 |
| Hawai ⁽³⁾ | 1,007 | 1,084 | 849 | 769 | 555 | 1,311 | 1,038 | 1,653 | 1,751 |
| New Zealand | 441 | 1,853 | 319 | 740 | 1,155 | 670 | 757 | 226 | 585 |

(1) Year ending on 30 September of the year indicated. — (2) Trade with the U. S. A. — (3) Year ending on 30 June of the year indicated.

nican Republic. American States alone have been mentioned so far. Only after them there appear, in an order which remains rather uncertain owing to great variations, countries of other parts of the world, *e. g.* Australia, of late also New Zealand and, at some distance from them, Hawai, as Ocean countries, and two European States, Hungary and France, which sometimes reach the level of the American countries last mentioned. France, however, imports more honey than she exports. Asia and Africa are each represented in the table by a single country. As a final result, we find thus that by far the largest part of honey exports comes from America.

Similarly uniform appears the geographical distribution of the importing countries. The table shows only European States. It is, however, to be noted in this connection that quantities sent to the United States from their possessions of Porto Rico and Hawai, which were already given in the export table, have not been reproduced here, the more so as that trade is to a certain extent not foreign trade. The highest figures are regularly to be found in the case of Germany, and have substantially increased there in the course of the last years. They include, however, artificial honey as well. The second place is taken, curiously enough, by the Netherlands, which have also been able to show of late a considerable increase of such imports. Here, imports of artificial honey

Honey - Imports.

(in 1,000 lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|---------------------------------|--------|--------|--------|--------|----------------------|---------------------|----------------------|---------------------|--------|
| Germany ¹⁾ | ... | 15,516 | 13,997 | 12,706 | 14,459 | 10,317 | 10,352 | 9,855 | 10,291 |
| Austria | — | 1,288 | 1,216 | 939 | 854 | 730 | 937 | 1,188 | 1,261 |
| Belgo-Luxemburg Ec. Un. | 2,122 | 2,098 | 2,342 | 1,707 | 1,278 | 1,259 | 1,153 | 1,306 | 1,371 |
| France | ... | 1,992 | 2,652 | 2,583 | 2,064 | 3,254 | 6,200 | 4,555 | 3,432 |
| Netherlands | 13,819 | 11,273 | 10,743 | 9,903 | 10,037 ¹⁾ | 7,196 ¹⁾ | 10,076 ¹⁾ | 8,698 ¹⁾ | 9,698 |
| United Kingdom | ... | 11,479 | 10,112 | 8,213 | 7,161 | 7,318 | 8,933 | 9,008 | 8,761 |
| Switzerland | 961 | 952 | 921 | 498 | 284 | 515 | 913 | 601 | 634 |

(1) Including artificial honey.

were, up to 1934, included in the respective figures. The United Kingdom takes only the third place, showing again of late an increase of imports. French imports have much decreased since about 1933. The Belgo-Luxemburg Customs Union has been importing in recent times nearly the same amounts as France. Two other States, former Austria and Switzerland, close the number of the principal importers of honey. If, for the reason given above, we leave aside the United States, we see that Western- and Central-European countries have almost alone a substantial import of honey.

International trade in wax.

As far as wax is concerned, other waxes of animal origin are counted together with beeswax in the statistics of many countries. Cleaned or bleached wax, which in a few cases figures under a separate heading, has been added up with the other amounts of wax.

The differences from one year to another we find in the amounts exported are kept, in the case of wax, within much narrower limits than in the case of honey. The largest exports are those of Angola, which reached their highest level in 1937. About half as large are those of Brazil, in the case of which country, however, recent data are still lacking. The third place is taken by Tanganyika, which also showed the largest exports in 1937. Madagascar had exceeded in 1930, with 1,287,000 pounds, its 1938 exports. After French Equatorial Africa and French Western Africa, which take respectively the fifth and the sixth place among the exporting countries, and the first of which shows a substantial increase of its exports during the period under examination, there appears an Asiatic country, Turkey. The American countries exporting honey, Cuba, Chile and the Dominican Republic, have also rather considerable and relatively constant exports.

The countries having a large export of wax are thus by no means the same as the main exporters of honey; on the contrary, the largest amount of honey

exported comes from Africa. The share of American States is rather noteworthy as well, but, in their case, a country of no importance as exporter of honey, Brazil, furnishes the largest quantities of wax. While, in the case of honey, one

Beewax - Exports.

(in 1,000 lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|---|-------|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Belgo-Luxemburg (Ec. Un. ⁽¹⁾) | 697 | 793 | 635 | 668 | 745 | 977 | 521 | 384 | 272 |
| Spain ⁽¹⁾ | ... | ... | ... | ... | 107 | 294 | 195 | 233 | 198 |
| France ⁽¹⁾ | ... | 790 | 460 | 367 | 367 | 411 | 487 | 467 | 762 |
| Portugal ⁽¹⁾ | ... | ... | 138 | 68 | 60 | 293 | 185 | 271 | 175 |
| Cuba | ... | 638 | 611 | 576 | 668 | 447 | 475 | 562 | 1,285 |
| Dominican Republic | 427 | 457 | 469 | 462 | 509 | 282 | 257 | 219 | 185 |
| Brazil | ... | ... | ... | 1,653 | 1,523 | 1,335 | 1,015 | 807 | 1,362 |
| Chile | 482 | 596 | 623 | 745 | 631 | 575 | 439 | 841 | 376 |
| Burma ⁽¹⁾ | ... | ⁽²⁾ 678 ⁽²⁾ | 665 | — | — | — | — | — | — |
| China | 132 | 190 | 172 | 123 | 160 | 140 | 154 | 104 | 258 |
| Turkey | 842 | 689 | 538 | 663 | 686 | 806 | 685 | 599 | 617 |
| French Equatorial Africa ⁽¹⁾ | ... | 1,031 | 643 | 791 | 947 | 679 | 658 | 548 | 295 |
| French West Africa ⁽¹⁾ | ... | 985 | 899 | 862 | 1,272 | 1,074 | 926 | 867 | 902 |
| Angola ⁽¹⁾ | 2,892 | 2,500 | 3,350 | 2,842 | 2,336 | 2,088 | 2,409 | 2,505 | 3,078 |
| Belgian Congo | ... | 536 | 365 | 255 | 127 | 94 | 65 | 25 | 17 |
| Egypt ⁽¹⁾ | 431 | 307 | 280 | 411 | 354 | 399 | 264 | 455 | 266 |
| Kenya and Uganda | ... | 169 | 150 | 90 | 132 | 203 | 107 | 118 | 127 |
| Madagascar | ... | 1,123 | 1,098 | 1,096 | 849 | 965 | 843 | 711 | 1,008 |
| French Morocco ⁽¹⁾ | ... | 306 | 313 | 617 | 138 | 322 | 169 | 254 | 384 |
| Mozambique: Province ⁽¹⁾ | ... | 104 | 239 | 174 | 340 | 146 | 200 | 279 | 216 |
| : Comp. T. ⁽¹⁾ | 137 | 38 | 91 | 89 | 44 | 77 | 55 | 51 | 69 |
| Tanganyika | ... | 1,537 | 1,653 | 1,174 | 1,189 | 912 | 1,523 | 876 | 1,360 |
| Tunisia ⁽¹⁾ | ... | 120 | 244 | 108 | 163 | 133 | 123 | 127 | 161 |

(1) Including wax of other insects. — (2) Wax of all kinds other than paraffin. — (3) Year ending 31 March of the following year.

part of the world, America, furnishes alone nearly the total exports, the preeminence of Africa is by no means quite so marked in the case of wax. The European countries which, next to the American and Asiatic ones, figure with considerable exports, France and the Belgo-Luxemburg Customs Union, are at the same time importers of wax, often on a much larger scale.

Contrary to what happens in the case of honey, the United States take the first place among the importers of wax. This is hardly surprising, considering what has been said above about the production of wax. We note here a remarkable decrease of imports in 1938, as compared with the preceding two years. The other countries are—apart from Canada, whose imports are not large—European ones. They are mostly the same ones which import honey, but their order is slightly different: the United Kingdom takes here the first place, and Germany the second one, while the Netherlands are relatively unimportant. The imports of France are very large, and sometimes even exceed those of Germany. In these two countries, we find, since 1936, a decrease of imports, which has been

particularly striking in France. Besides Western- and Central-European countries, there are represented, with considerable imports, two Balkan States, Bulgaria and Yugoslavia, as well.

Thus American and European countries are the chief buyers of wax.

Bee-wax — Imports.

(in 1,000 lb.)

| COUNTRIES | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 | 1931 |
|--|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Germany ⁽¹⁾ | ... | 2,109 | 2,328 | 2,765 | 2,015 | 2,624 | 1,674 | 1,394 | 1,451 |
| Austria ⁽¹⁾ | — | 123 | 161 | 156 | 206 | 165 | 138 | 158 | 200 |
| Belgo-Luxemburg (Ec. Un.) ⁽¹⁾ | 757 | 1,145 | 1,162 | 859 | 876 | 1,234 | 936 | 945 | 754 |
| Bulgaria | 170 | 470 | 265 | 329 | 206 | 255 | 323 | 266 | 404 |
| France ⁽¹⁾ | ... | 1,808 | 2,515 | 3,096 | 2,510 | 2,343 | 2,939 | 2,470 | 2,390 |
| Netherlands ⁽¹⁾ | 769 | 622 | 516 | 508 | 679 | 528 | 541 | 582 | 741 |
| United Kingdom | ... | 3,475 | 3,306 | 3,288 | 3,026 | 2,788 | 2,584 | 2,189 | 3,094 |
| Switzerland | 573 | 366 | 319 | 423 | 512 | 406 | 375 | 533 | 391 |
| Yugoslavia | 289 | 284 | 259 | 189 | 224 | 245 | 120 | 179 | 194 |
| Canada | ... | 241 | 229 | 297 | 270 | 200 | 151 | 134 | 228 |
| United States | ⁽¹⁾ 4,715 | 2,985 | 5,398 | 4,270 | 4,401 | 3,491 | 3,814 | 3,484 | 3,840 |

(1) Including wax of other insects.

By way of summarising what has been said above, we find that the countries which are the largest exporters of wax have in no case the same importance as far as exports of honey are concerned. Honey comes almost exclusively from American countries, and wax chiefly from Africa. On the contrary, importing countries are in both cases practically the same. If the amounts of honey and wax show such strong fluctuations, not only in the case of exporting countries, but in that of importing countries as well, the fact can be explained by the great differences in the production of the exporting countries and by the circumstance that the importing States have a production of their own, the extent of which varies very much indeed.

WALTHER SCHUBRING.

CURRENT INFORMATION ON LIVESTOCK AND DERIVATIVES.

Switzerland: According to provisional surveys of the Swiss Farmers Union, during the month of July the average quantity of milk delivered by 680 milk companies was 1.5 per cent. less than in July 1939. The cantons of Eastern Switzerland, Thurgovia, St. Gall, Zurich and Argovia show a slight increase, while in the other regions, particularly in romanic Switzerland, the deliveries were inferior to those of last year. This diminution in the production of milk seems to be due especially to a slight reduction in the number of cows on account of the advantageous conditions for the disposal of animals to be eliminated from the herd.

Yugoslavia: Thanks to the good conditions of green fodder, pastures and meadows, the feeding of the cattle is satisfactory and its sanitary conditions are considered good.

Argentina: The latest official report confirms that the sanitary conditions of the cattle in August were on the whole good all over the country.

CURRENT INFORMATION ON SERICULTURE.

Japan. — The production of spring cocoons in 1940 is estimated at 330,383,000 lb. against 369,891,400 lb. in 1939 and an average of 364,302,500 lb. in 1934 to 1938; percentages, 89.3 and 90.7.

TRADE

| COUNTRIES | JULY | | | | TWELVE MONTHS (August 1-July 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|---|-----------------|-------|------------------|-------|----------------------------------|------------|------------------|-----------|----------------------------------|--------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Wheat. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (1) 19,924 | (1) 15,154 | (1) 0 | (1) 0 | 16,316 | 0 |
| Romania | 70 | 2,597 | 0 | 0 | 18,675 | 27,571 | 0 | 0 | — | — |
| Yugoslavia | 94 | 79 | 0 | 0 | 5,431 | 3,246 | 0 | 0 | — | — |
| United States | 1,125 | 1,786 | 378 | 621 | 13,134 | 46,034 | 6,173 | 6,134 | — | — |
| Argentina | 7,927 | 6,601 | — | — | 104,862 | 70,370 | — | — | — | — |
| Iraq | 9 | 15 | 0 | 0 | 1,092 | 621 | 0 | 0 | — | — |
| Turkey | 6 | 17 | — | — | 1,402 | 1,098 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 727 | 987 | 0 | 0 | 7,156 | 7,740 | — | — |
| Portugal | 0 | 0 | 78 | 3 | 0 | 0 | 535 | 1,295 | — | — |
| Mexico | ... | ... | ... | ... | (4) 0 | (4) 0 | (4) 40 | (4) 778 | 0 | 1,243 |
| Peru | ... | ... | ... | ... | (2) 0 | (2) 0 | (2) 2,394 | (2) 1,975 | 0 | 2,625 |
| China | 2 | 54 | 0 | 2,231 | 263 | 511 | 3,081 | 9,597 | — | — |
| Taiwan | — | — | ... | ... | — | — | (2) 3 | (2) 9 | — | 14 |
| Wheat Flour. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (1) 2,181 | (1) 1,009 | (1) 0 | (1) 0 | 1,027 | 0 |
| Romania | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | — | — |
| Yugoslavia | 37 | 0 | 0 | 0 | 325 | 32 | 0 | 0 | — | — |
| United States | 755 | 1,850 | 7 | 19 | 11,758 | 14,059 | 129 | 159 | — | — |
| Argentina | 121 | 168 | — | — | 1,951 | 2,049 | — | — | — | — |
| Taiwan | ... | ... | ... | ... | (2) 21 | (2) 6 | — | — | 8 | — |
| Iraq | 17 | 13 | 0 | 0 | 176 | 153 | 0 | 0 | — | — |
| Japan | ... | ... | ... | ... | (2) 4,084 | (2) 3,432 | (2) 114 | (2) 0 | 4,594 | 0 |
| Turkey | 0 | 1 | — | — | 1 | 75 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 2 | 0 | 0 | 35 | 43 | — | — |
| Portugal | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 38 | — | — |
| Haiti | — | — | ... | ... | — | — | (1) 161 | (1) 163 | — | 177 |
| Mexico | ... | ... | ... | ... | (4) 0 | (4) 0 | (4) 1 | (4) 1 | 0 | 2 |
| Peru | ... | ... | ... | ... | (2) 0 | (2) 0 | (2) 35 | (2) 36 | 0 | 42 |
| China | 19 | 146 | 711 | 511 | 856 | 1,176 | 5,994 | 7,108 | — | — |
| Total Wheat and Flour †). — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | NET EXPORTS (*) | | NET IMPORTS (**) | | NET EXPORTS (*) | | NET IMPORTS (**) | | N. EX. (*) | N. IMP. (**) |
| Hungary | ... | ... | — | — | (1) 22,832 | (1) 16,499 | — | — | 16,685 | — |
| Greece | — | — | 727 | 990 | — | — | 7,203 | 7,797 | — | — |
| Portugal | — | — | 78 | 3 | — | — | 551 | 1,345 | — | — |
| Romania | 71 | 2,597 | — | — | 18,677 | 27,574 | — | — | — | — |
| Yugoslavia | 144 | 80 | — | — | 5,864 | 3,289 | — | — | — | — |
| United States | 1,744 | 3,607 | — | — | 22,467 | 58,432 | — | — | — | — |
| Haiti | — | — | ... | ... | — | — | (1) 215 | (1) 218 | — | 236 |
| Mexico | — | — | ... | ... | — | — | (4) 42 | (4) 779 | — | 1,246 |
| Argentina | 8,089 | 6,825 | — | — | 107,463 | 73,102 | — | — | — | 2,681 |
| Peru | — | — | ... | ... | — | — | (2) 2,441 | (2) 2,023 | — | — |
| China | — | — | 920 | 2,664 | — | — | 9,668 | 16,996 | — | — |
| Taiwan | ... | ... | ... | ... | (2) 24 | — | — | — | — | 3 |
| Iraq | 32 | 32 | — | — | 1,327 | 825 | — | — | — | — |
| Turkey | 6 | 19 | — | — | 1,404 | 1,198 | — | — | — | — |
| Rye. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (1) 271 | (1) 299 | (2) 0 | (2) 0 | 309 | 0 |
| Romania | 124 | 90 | 0 | 0 | 2,172 | 640 | 0 | 0 | — | — |
| United States | 1 | 0 | 0 | 0 | 411 | 374 | 0 | 0 | — | — |
| Argentina | 7 | 415 | — | — | 5,676 | 2,076 | — | — | — | — |
| Turkey | 0 | 10 | — | — | 195 | 177 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | — |

(*) Excess of exports over imports. — (**) Excess of imports over exports.

(†) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.333 centals of grain.

(1) Up to June 30. — (2) Up to May 31. — (3) Up to April 30. — (4) Up to March 31.

| COUNTRIES | JULY | | | | TWELVE MONTHS (August 1-July 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|---------|-------|---------|------|----------------------------------|----------------------|----------------------|----------------------|----------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Barley. Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (¹) 212 | (¹) 106 | (¹) 0 | (¹) 0 | 107 | 0 |
| Romania | 0 | 482 | 0 | 0 | 2,329 | 4,195 | 0 | 0 | — | — |
| United States | 74 | 125 | 28 | 82 | 1,645 | 5,101 | 290 | 237 | — | — |
| Argentina | 171 | 235 | — | — | 8,848 | 4,644 | — | — | — | — |
| Iraq | 558 | 326 | 0 | 0 | 5,177 | 4,583 | 0 | 0 | — | — |
| Turkey | 28 | 338 | — | — | 1,037 | 2,740 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 344 | — | — |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 106 | (¹) 78 | 0 | 146 |
| Oats. — Thousand centals (1 cental = 100 lb.) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 0 | (¹) 0 | 0 | 0 |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | — |
| United States | 3 | 4 | 366 | 104 | 65 | 1,114 | 3,635 | 427 | — | — |
| Argentina | 91 | 505 | — | — | 8,397 | 6,118 | — | — | — | — |
| Turkey | 0 | 39 | — | — | 6 | 231 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 165 | 0 | — | — |
| Mexico | ... | ... | ... | ... | (¹) 10 | (¹) 0 | (¹) 6 | (¹) 22 | 0 | 25 |
| Peru | — | — | — | — | — | — | (¹) 15 | (¹) 18 | — | 26 |
| Maize. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | ... | ... | ... | ... | (¹) 75 | (¹) 809 | (¹) 965 | (¹) 0 | 1,038 | 0 |
| Romania | 2,308 | 703 | 0 | 0 | 12,054 | 11,551 | 0 | 0 | 12,014 | 0 |
| Yugoslavia | 0 | 209 | 0 | 0 | 14 | 2,226 | 0 | 0 | 2,334 | 0 |
| United States | 3,735 | 314 | 284 | 17 | 18,339 | 15,082 | 537 | 209 | 19,783 | 253 |
| Haiti | ... | ... | ... | ... | (¹) 5 | (¹) 2 | — | — | 8 | — |
| Argentina | 2,208 | 9,336 | — | — | 39,944 | 58,669 | — | — | 75,057 | — |
| Iraq | 0 | 0 | — | — | 1 | 2 | — | — | 3 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 96 | 0 | 0 | 321 | 1,245 | 0 | 1,336 |
| Portugal | 0 | 0 | 15 | 84 | 0 | 0 | 220 | 689 | 0 | 864 |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 563 | (¹) 381 | 0 | 807 |
| Peru | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 0 | (¹) 0 | 0 | 0 |
| Rice. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| United States | 248 | 221 | 23 | 84 | 1,991 | 1,977 | 239 | 497 | 3,093 | 711 |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 30 | (¹) 0 | (¹) 0 | 49 | 0 |
| Taiwan | ... | ... | ... | ... | (¹) 81 | (¹) 168 | (¹) 0 | (¹) 0 | 296 | 0 |
| Iraq | 0 | 0 | 0 | 0 | 4 | 10 | 0 | 1 | 15 | 1 |
| Thailand | 3,902 | 2,200 | — | — | 21,684 | 23,293 | — | — | 41,010 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 46 | 69 | 0 | 0 | 487 | 468 | 0 | 647 |
| Hungary | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 199 | (¹) 184 | 0 | 584 |
| Portugal | 0 | 0 | 27 | 6 | 1 | 0 | 54 | 26 | 0 | 184 |
| Romania | — | — | 5 | 29 | — | — | 199 | 301 | — | 360 |
| Yugoslavia | 0 | 0 | 5 | 37 | 0 | 0 | 145 | 231 | 0 | 397 |
| Haiti | — | — | ... | ... | — | — | 4 | 7 | — | 11 |
| Peru | ... | ... | ... | ... | (¹) 0 | (¹) 2 | (¹) 152 | (¹) 250 | 2 | 463 |
| China | 74 | 2 | 1,916 | 467 | 106 | 145 | 9,351 | 5,316 | 156 | 7,060 |

(¹) Up to June 30. — (²) Up to May 31. — (³) Up to April 30. — (⁴) Up to March 31.

| COUNTRIES | JULY | | | | SEVEN MONTHS (January 1-July 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|--|----------------------------------|--------|---------|--------|-----------------------------------|------------------------|-------------------------|-------------------------|-----------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Linseed. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 2 | 3 | 2 |
| Argentina | 192 | 1,778 | — | — | 13,710 | 18,451 | — | — | 26,082 | — |
| China | 0 | 3 | — | — | 6 | 79 | — | — | 99 | — |
| Iraq | 6 | 7 | — | — | 13 | 17 | — | — | 63 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 17 | 0 | 0 | 24 | 45 | 0 | 71 |
| Hungary | — | — | — | — | 0 | 0 | 25 | 33 | 0 | 34 |
| Portugal | — | — | 2 | 11 | — | — | 43 | 22 | — | 161 |
| United States | — | — | 370 | 629 | — | — | 4,820 | 6,656 | — | 8,976 |
| Cotton. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | TWELVE MONTHS (August 1-July 31) | | | | TWELVE MONTHS (August 1-July 31) | | | | | |
| | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| United States | 714 | 565 | 91 | 79 | 32,714 | 17,562 | 841 | 749 | — | — |
| Haiti | — | — | — | — | (^a) 69 | (^a) 101 | — | — | 104 | — |
| Mexico | — | — | — | — | (^a) 87 | (^a) 243 | (^a) 13 | (^a) 4 | 308 | 9 |
| Argentina | 135 | 145 | — | — | 573 | 555 | — | — | — | — |
| Peru | — | — | — | — | (^a) 1,362 | (^a) 1,358 | — | — | 1,801 | — |
| Iraq | 2 | 1 | 1 | 0 | 59 | 53 | 2 | 2 | — | — |
| Turkey | 8 | 19 | — | — | 129 | 385 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 16 | 5 | 0 | 0 | 89 | 49 | — | — |
| Hungary | — | — | — | — | (^a) 0 | (^a) 0 | 552 | 580 | 0 | 629 |
| Portugal | — | — | 35 | 15 | — | — | 566 | 474 | — | — |
| Romania | 0 | 0 | 17 | 43 | 0 | 0 | 308 | 433 | — | — |
| Yugoslavia | 0 | 0 | 11 | 44 | 0 | 0 | 454 | 515 | — | — |
| China | 2 | 13 | 700 | 602 | 87 | 1,305 | 5,762 | 3,698 | — | — |
| Taiwan | — | — | — | — | — | 2 | (^a) 0 | 0 | — | 1 |
| Japan | — | — | — | — | (^a) 0 | (^a) 1 | 9,673 | 9,661 | 1 | 13,176 |
| Wool. — Thousand lb. | | | | | | | | | | |
| | ELEVEN MONTHS (Sept. 1-July 31) | | | | TWELVE MONTHS (Sept. 1-Aug. 31) | | | | | |
| | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Argentina (a) | 5,313 | 19,279 | — | — | 195,824 | 290,568 | — | — | 299,140 | — |
| Peru (b) | 3,408 | 5,137 | — | — | 68,549 | 53,129 | — | — | 56,736 | — |
| China | — | — | — | — | (^a) 10,635 | (^a) 8,951 | — | — | 12,022 | — |
| Iraq | 174 | 251 | — | — | 1,098 | 6,296 | — | — | 6,671 | — |
| Turkey | 88 | 1,964 | 0 | 15 | 16,460 | 17,238 | 62 | 57 | 19,672 | 57 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 1,448 | 1,852 | — | — | 6,923 | 17,289 | — | — | 21,272 | — |
| Greece | 97 | 287 | 88 | 974 | 642 | 1,982 | 4,279 | 7,163 | 2,099 | 7,657 |
| Hungary | — | — | — | — | (^a) 2 | (^a) 999 | (^a) 3,111 | (^a) 2,661 | 1,027 | 3,208 |
| Portugal | 0 | 406 | 93 | 165 | 2,035 | 2,068 | 5,197 | 3,206 | 2,251 | 3,316 |
| Romania | 0 | 0 | 46 | 73 | 0 | 40 | 337 | 807 | 62 | 840 |
| Yugoslavia | 0 | 51 | 157 | 829 | 0 | 326 | 5,915 | 10,904 | 353 | 11,475 |
| United States | 2 | 71 | 17,503 | 14,055 | 483 | 401 | 295,936 | 192,969 | 417 | 209,676 |
| Mexico | — | — | — | — | (^a) 0 | (^a) 0 | (^a) 2,837 | (^a) 2,456 | 139 | 4,835 |
| Japan | — | — | — | — | (^a) 0 | (^a) 0 | (^a) 58,806 | (^a) 72,764 | 0 | 107,551 |
| Butter. — Thousand lb. | | | | | | | | | | |
| | SEVEN MONTHS (January 1-July 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | | | | | |
| | | | | | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Denmark | 17,858 | 32,540 | — | — | 177,702 | 193,093 | — | — | 330,267 | 0 |
| Hungary | — | — | — | — | (^a) 443 | (^a) 1,590 | (^a) 0 | (^a) 0 | 3,305 | 0 |
| Portugal | 11 | 9 | 0 | 0 | 71 | 62 | 0 | 0 | 157 | 0 |
| Romania | 66 | 101 | 0 | 0 | 304 | 384 | 0 | 0 | 935 | 0 |
| United States | 240 | 154 | 53 | 66 | 1,545 | 1,111 | 675 | 611 | 2,308 | 1,107 |
| Argentina | 4,169 | 600 | — | — | 18,113 | 8,459 | — | — | 19,745 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 35 | 97 | — | — | 130 | 690 | — | 1,074 |
| Mexico | — | — | — | — | — | — | (^a) 29 | (^a) 33 | — | 134 |
| Peru | — | — | — | — | (^a) 0 | (^a) 0 | (^a) 104 | (^a) 146 | 0 | 335 |
| China | — | — | 11 | 40 | — | — | 227 | 377 | — | 593 |
| Iraq | 0 | 0 | 2 | 4 | 0 | 2 | 24 | 29 | 2 | 40 |

(a) Unwashed wool. — (b) Washed wool.

(^a) Up to June 30. — (^b) Up to May 31. — (^c) Up to April 30. — (^d) Up to March 31.

| COUNTRIES | JULY | | | | SEVEN MONTHS (January 1-July 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|-------------------------------|---------|---------|---------|---------|----------------------------------|--------------------------|------------------------|------------------------|-----------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| | | | | | | | | | | |
| Cheese. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Hungary | 15 | 13 | 0 | 4 | (¹) 322 | (¹) 359 | (¹) 4 | (¹) 0 | 741 | 2 |
| Portugal | 97 | 0 | 0 | 4 | 154 | 132 | 29 | 82 | 216 | 201 |
| Romania | 1,135 | 406 | — | — | 256 | 64 | 20 | 35 | 392 | 60 |
| Argentina | — | — | — | — | 4,173 | 2,718 | — | — | 5,479 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 15 | 51 | 49 | 340 | 60 | 1,389 | 1,925 | 95 | 2,202 |
| United States | 185 | 115 | 1,785 | 3,135 | 1,133 | 840 | 22,763 | 28,418 | 1,479 | 59,075 |
| Mexico | — | — | — | — | (¹) 0 | (¹) 2 | (¹) 251 | (¹) 262 | 7 | 882 |
| Peru | — | — | — | — | (¹) 0 | (¹) 159 | (¹) 159 | (¹) 168 | 2 | 721 |
| Iraq | 0 | 0 | 2 | 2 | 0 | 15 | 24 | 42 | 15 | 60 |
| Cacao. — Thousand lb. | | | | | | | | | | |
| | | | | | TEN MONTHS (Oct. 1-July 31) | | | | TWELVE MONTHS (Oct. 1-Sept. 30) | |
| <i>Exporting Countries:</i> | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Haiti | — | — | — | — | (¹) 2,529 | (¹) 3,794 | — | — | 3,979 | — |
| Dominican Republic | — | — | — | — | (¹) 27,842 | (¹) 41,599 | — | — | 63,690 | — |
| Ecuador | — | — | — | — | (¹) 14,242 | (¹) 28,065 | — | — | 36,171 | — |
| Gold Coast | — | — | — | — | (¹) 366,063 | (¹) 557,328 | — | — | 643,415 | — |
| Nigeria & Cameroon | — | — | — | — | (¹) 138,973 | (¹) 232,655 | — | — | 259,104 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 51 | 326 | 2 | 0 | 1,272 | 3,646 | 0 | 4,101 |
| Hungary | — | — | — | — | — | — | (¹) 2,286 | (¹) 9,938 | — | 13,045 |
| Portugal | 0 | 0 | 62 | 88 | 26 | 0 | 1,179 | 1,012 | 2 | 1,215 |
| Romania | — | — | 110 | 258 | — | — | 2,302 | 3,400 | — | 3,783 |
| United States | — | — | 92,255 | 36,048 | — | — | 530,494 | 500,264 | — | 583,184 |
| Mexico | — | — | — | — | — | — | (¹) 1,986 | (¹) 238 | — | 1,345 |
| Peru | — | — | — | — | (¹) 0 | (¹) 0 | (¹) 265 | (¹) 423 | 0 | 620 |
| Tea. — Thousand lb. | | | | | | | | | | |
| | | | | | TWELVE MONTHS (July 1-June 30) | | | | TWELVE MONTHS (July 1-June 30) | |
| <i>Exporting Countries:</i> | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| China | 6,629 | 3,569 | 1,645 | 1,488 | 84,492 | 83,388 | 18,576 | 7,015 | — | — |
| Taiwan | — | — | — | — | (¹) 13,827 | (¹) 19,112 | (¹) 0 | (¹) 0 | 20,435 | 0 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 0 | 37 | — | — | 238 | 414 | — | — |
| Hungary | — | — | — | — | — | — | 198 | 677 | — | — |
| Portugal | — | — | 26 | 22 | — | — | 384 | 317 | — | — |
| Romania | — | — | 51 | 106 | — | — | 833 | 800 | — | — |
| United States | — | — | 7,315 | 6,799 | — | — | 100,075 | 89,601 | — | — |
| Mexico | — | — | — | — | — | — | (¹) 57 | (¹) 57 | — | 84 |
| Peru | — | — | — | — | — | — | (¹) 1,261 | (¹) 972 | — | 1,074 |
| Iraq | 0 | 0 | 503 | 564 | 7 | 71 | 6,748 | 7,300 | — | — |
| Turkey | — | — | 148 | 229 | — | — | 2,357 | 2,174 | — | — |
| Coffee. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Boatemara | 3,719 | 2,769 | — | — | 90,496 | 90,196 | — | — | — | — |
| Haiti | — | — | — | — | 43,369 | 64,854 | — | — | — | — |
| Mexico | — | — | — | — | (¹) 61,514 | (¹) 58,551 | — | — | 79,766 | — |
| Nicaragua | — | — | — | — | 32,662 | 40,305 | — | — | — | — |
| Salvador | — | — | — | — | 111,962 | 130,792 | — | — | — | — |
| Brazil | 91,075 | 152,250 | — | — | 1,996,449 | 2,155,720 | — | — | — | — |
| Colombia | 54,068 | 30,964 | — | — | 496,728 | 537,290 | — | — | — | — |
| Ecuador | — | — | — | — | (¹) 28,894 | (¹) 27,730 | — | — | 31,326 | — |
| Peru | — | — | — | — | (¹) 5,628 | (¹) 5,829 | (¹) 0 | (¹) 2 | 6,546 | 4 |
| Venezuela | — | — | — | — | 47,349 | 69,823 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 880 | 1,052 | — | — | 10,730 | 13,018 | — | — |
| Hungary | — | — | — | — | — | — | 2,551 | 5,390 | — | — |
| Portugal | 653 | 220 | 1,321 | 1,014 | 3,754 | 1,903 | 18,682 | 13,761 | — | — |
| Romania | — | — | 234 | 602 | — | — | 5,053 | 8,025 | — | — |
| Yugoslavia | — | — | 1,940 | 1,440 | — | — | 14,692 | 15,829 | — | — |
| United States | 600 | 886 | 183,943 | 139,289 | 12,253 | 10,598 | 2,043,624 | 1,965,955 | — | — |
| Iraq | 0 | 0 | 97 | 247 | 0 | 0 | 2,776 | 2,588 | — | — |
| Turkey | — | — | 437 | 935 | — | — | 13,334 | 12,260 | — | — |

(¹) Up to June 30. — (²) Up to May 31. — (³) Up to April 30. — (⁴) Up to March 31.

STOCKS

Total stocks of home-grown cereals and linseed in Canada.

| PRODUCTS | Last day of month | | | | |
|-------------------|-------------------|------------|-----------|-----------|-----------|
| | July 1940 | March 1940 | July 1939 | July 1938 | July 1937 |
| | thousand cents | | | | |
| Wheat | 163,800 | 223,185 | 57,008 | 14,132 | 19,763 |
| Rye | 6,735 | 3,345 | 1,102 | 552 | 229 |
| Barley | 5,523 | 17,425 | 6,170 | 3,095 | 2,072 |
| Oats | 15,781 | 52,315 | 16,599 | 6,630 | 6,210 |
| Linseed | 478 | 559 | 67 | 123 | 260 |

Commercial cereals in store in Canada and the United States.

| PRODUCTS AND LOCATION | Friday or Saturday nearest 1st of month ⁽¹⁾ | | | | |
|---|--|-----------------------|-----------|----------------|----------------|
| | September 1940 | August 1940 | July 1940 | September 1939 | September 1938 |
| | thousand cents | | | | |
| WHEAT : | | | | | |
| Canadian in Canada | ... | ²⁾ 153,682 | 154,279 | 81,476 | 39,274 |
| U.S. in Canada | ... | ... | 383 | 347 | 64 |
| U.S. in the United States | 108,031 | 96,090 | 52,395 | 99,773 | 80,235 |
| Canadian in the United States | 16,696 | 14,147 | 13,064 | 4,113 | 325 |
| TOTAL | ... | ... | 220,121 | 185,709 | 119,898 |
| RYE : | | | | | |
| Canadian in Canada | ... | ²⁾ 1,023 | 1,042 | 998 | 908 |
| U.S. in Canada | ... | ... | 13 | 13 | 10 |
| U.S. in the United States | 5,120 | 5,061 | 5,323 | 5,178 | 3,822 |
| Canadian in the United States | 1,873 | 1,739 | 1,562 | 619 | 0 |
| TOTAL | ... | ... | 7,940 | 6,808 | 4,740 |
| BARLEY : | | | | | |
| Canadian in Canada | ... | ²⁾ 2,200 | 2,933 | 3,479 | 3,838 |
| U.S. in Canada | ... | ... | 2 | 7 | 53 |
| U.S. in the United States | 4,922 | 2,687 | 3,339 | 8,114 | 7,246 |
| Canadian in the United States | 566 | 579 | 587 | 0 | 0 |
| TOTAL | ... | ... | 6,861 | 11,600 | 11,137 |
| OATS : | | | | | |
| Canadian in Canada | ... | ²⁾ 1,910 | 2,160 | 2,307 | 1,007 |
| U.S. in Canada | ... | ... | 21 | 20 | 498 |
| U.S. in the United States | 2,686 | 886 | 1,002 | 4,698 | 6,591 |
| Canadian in the United States | 78 | 31 | 83 | 8 | 0 |
| TOTAL | ... | ... | 3,266 | 7,033 | 8,096 |
| MAIZE : | | | | | |
| U.S. in Canada | ... | ... | 935 | 2,145 | 2,881 |
| Argentine in Canada | ... | ... | ... | 2 | 78 |
| South African in Canada | ... | ... | ... | 441 | 95 |
| Australian in Canada | ... | ... | ... | 7 | 0 |
| U.S. in the United States | 15,747 | 14,198 | 14,235 | 7,948 | 5,874 |
| TOTAL | ... | ... | ... | 10,543 | 8,928 |

⁽¹⁾ Friday for Canada, Saturday for the United States. — ⁽²⁾ Preliminary data of July 26.

Commercial cereals and oilseeds in store in Argentina.*

| PRODUCTS AND LOCATION | First day of month | | | | |
|--------------------------------------|-------------------------|-------------------------|-------------------------|------------------|-------------|
| | August 1940 | July 1940 | June 1940 | August 1939 | August 1938 |
| | thousand cents | | | | |
| Wheat in the ports | 14,736 | 19,685 | 27,393 | (¹) | 6,996 |
| Wheat in other positions | 18,711 | 22,991 | 28,137 | (¹) | 20,094 |
| TOTAL | (¹) 33,447 | (¹) 42,676 | (¹) 55,530 | (¹) | 27,090 |
| Rye | 4,637 | 4,552 | 4,722 | 1,398 | 196 |
| Barley | 4,512 | 4,814 | 4,976 | 1,439 | 897 |
| Oats | 3,239 | 3,415 | 3,625 | 3,189 | 1,808 |
| Maize in the ports | 5,418 | 4,398 | 5,088 | 3,370 | 962 |
| Maize in other positions | 6,500 | 6,982 | 6,262 | 7,117 | 5,129 |
| TOTAL | 11,918 | 11,380 | 11,350 | 10,487 | 6,091 |
| Canaryseed | 497 | 522 | 524 | 291 | 280 |
| Linseed in the ports | 3,235 | 3,445 | 3,766 | 3,320 | 3,455 |
| Linseed in other positions | 2,633 | 2,809 | 3,096 | 2,667 | 3,667 |
| TOTAL | 5,868 | 6,254 | 6,862 | 5,987 | 7,122 |
| Sunflowerseed | 2,645 | 2,212 | 1,352 | 1,507 | — |

(¹) Including 23,683 thousand cents of 1939-40 crop. — (²) Including 26,135 thousand cents of 1939-40 crop. — (³) Including 29,904 thousand cents of 1939-40 crop. — (⁴) Figures for wheat in store have been withheld by governmental order.

* For stocks on September 1, see on p. 606.

Cotton stocks on hand in the United States.

| LOCATION | Last day of month | | | | |
|---|-------------------|-----------|-----------|-------------|-------------|
| | August 1940 | July 1940 | June 1940 | August 1939 | August 1938 |
| | thousand cents | | | | |
| In consuming establishments | 3,623 | 4,779 | 5,699 | 3,211 | 5,203 |
| In public storage and at compresses | 44,865 | 44,875 | 47,090 | 58,076 | 48,315 |
| TOTAL | 48,488 | 49,654 | 52,789 | 61,287 | 53,518 |

Cotton stocks according to varieties at Alexandria on August 31,

| DESCRIPTION | 1940 | 1939 | 1938 | 1937 | 1936 |
|---------------------------|----------------|------|-------|------|------|
| | thousand cents | | | | |
| | | | | | |
| Sakellaridis | 70 | 77 | 258 | 55 | 109 |
| Ashmuni | 394 | 241 | 421 | 127 | 116 |
| Zagora | 199 | 46 | 320 | 23 | 52 |
| Giza 7 | 337 | 198 | 301 | 22 | 36 |
| Maarad | 122 | 55 | 80 | 8 | 47 |
| Other varieties | 218 | 119 | 131 | 113 | 124 |
| TOTAL | 1,340 | 736 | 1,511 | 348 | 484 |

AUTHORITY: Commission de la Bourse de Minet-el-Bassal.

PRICES**PRICES FOR CEREALS OF THE NEW CROP**

Some information is here given about price fixing of cereals of the new crop in some countries.

France.

The French Government has fixed the producer's price for *wheat* of the 1940-crop at 214 frs. per 100 kg. This price remains the same as that of the old wheat, which was in force during August 1940, and it is applied to home-grown soft wheat, fair and merchantable of a specific weight of 74 kg. 500 to 75 kg. 499.

A storage, keeping and administration premium of 2 frs. per quintal and per month is added, so that the price will be set as shown in the following table, which indicates at the same time the price paid during the preceding season:

| Months | 1940-41 | 1939-40 | Months | 1940-41 | 1939-40 |
|---------------------|---------|---------|------------------|---------|---------|
| September | 214.00 | 197.50 | March | 226.00 | 206.50 |
| October | 216.00 | 199.00 | April | 228.00 | 208.00 |
| November | 218.00 | 200.50 | May | 230.00 | 209.50 |
| December | 220.00 | 202.00 | June | 232.00 | 211.00 |
| January | 222.00 | 203.50 | July | 234.00 | 212.50 |
| February | 224.00 | 205.00 | August | 236.00 | 214.00 |

Hungary.

The Hungarian Government has fixed the base price for cereals of the new crop for the 1940-41 season. These prices, to be paid to the producers, are:

Pengös 23.00 per quintal for *wheat* of a specific weight of 78 kg.;

Pengös 19.00 per quintal for *rye* of a specific weight of 71 kg.;

Pengös 20.70 per quintal for *oats* of a specific weight of 41 kg.;

Pengös 26.00, 25.00, and 24.000 per quintal for *barley malting* of extra quality, 1st quality and current quality, respectively; and Pengös 20.00, per quintal for *jodder barley* of average quality.

To these base prices the following monthly increases have to be added:

| | Wheat and Rye Pengös | Oats Pengös | | Malting barley Pengös | Fodder barley Pengös |
|------------------------|----------------------------|----------------|--------------------------|-----------------------------|----------------------------|
| September 1940 | 0.20 | 0.40 | Sept. 10 to 30, 1940 . . | 0.20 | 0.40 |
| October " | 0.20 | 0.40 | October " | 0.15 | 0.30 |
| November " | 0.15 | 0.30 | November " | 0.15 | 0.30 |
| December " | 0.15 | 0.25 | Dec. 1940 to March 1941 | 0.10 | 0.20 |
| January 1941 | 0.10 | 0.25 | | | |
| February to June 1941 | 0.10 | 0.20 | | | |

Italy.

The collective depots (*ammassi collettivi*) are to pay to the producers for cereals of the new crop the following prices, as fixed on August 31 last.

155 lire per quintal for *soft wheat* of good merchantable quality, hectolitre weight 75 kg., and 1 per cent. (maximum, impurities;

170 lire per quintal for *hard wheat* of good merchantable quality, hectolitre weight 78 kg.; and 1 per cent. (maximum) impurities;

135 lire per quintal for oats of current quality, sound, dry and merchantable, hectolitre weight 42 kg. (Obligatory stocking had been decreed by the law of July 12, 1940).

120 lire per quintal for *maize*, current quality, good, merchantable, with 16 per cent. humidity.

130 lire per quintal for *rough rice*.

The augmentations and diminutions depend upon the hectolitre weight as well as on the quality, and they remain the same as those settled for the preceding seasons. The prices refer to merchandise in bulk, free at collective depots.

Romania.

In compliance with the application of the system created in 1935 (1) to encourage the cultivation of wheat and assure remunerative prices to the farmers, the Government, by an order of the Council of Ministers dated August 1, 1940, has fixed this year also a *minimum* price for wheat of new crop. This price has been fixed at 68,000 lei per wagon, of 10 metric tons, of which 60,000 lei was the base price and 8,000 lei a compensating premium on the insufficient crop to the producers' f. o. r. producers station or wharf, under the condition that the weight per hectolitre is 74 kg., and that it contains no more than 3 per cent. impurities. The minimum price fixed in August 1939 was 42,000 lei for wheat weighing 75 kg., with 3 per cent. impurities.

A few days later a Decree dated August 10, 1940 fixed the producer's prices f. o. r. or wharf of producing points, for maize, rye, barley and oats of the new crop.

In the meantime, since it happened that the minimum price was greatly surpassed all over the country, an order of the Council of Ministers dated August 23, raised the premium to 15,000 lei, and decided that the new prices of wheat, fixed at 75,000 lei for August-October 1940 and at 78,000 lei for November 1940-January 1941, was to be considered no longer as a minimum price, but as a *fixed* price.

(1) See: *Monthly Bulletin of Agricultural Economics and Sociology*, I. I. A., October 1938, p. 510, May 1940, p. 202.

In the following table the prices fixed and the characteristics required for base qualities of the cereals of the new crop as they result from the order of the Council of Ministers, dated August 30, 1940 are given:

| Products | Price in lei for wagon of 10-tons | Characteristics of base quality |
|--|-----------------------------------|--|
| Wheat (Aug.-Oct.) | 75,000 | 74 kg. per hl.; 3 per cent. (maximum) impurities |
| Wheat (Nov.-Jan.) | 78,000 | Idem |
| Rye | 52,000 | 68 kg. per hl.; 3 per cent. (maximum) impurities |
| Barley | 40,000 | 61 kg. per hl.; 4 per cent. (maximum) impurities |
| Oats | 42,000 | 44 kg. per hl.; 4 per cent. (maximum) impurities |
| Maize | 49,000 | 14 degrees humidity; 3 per cent. diseased or deteriorated grains |
| Maize "Pignoletto" or "Cinquantino" | 56,350 | Idem |
| Maize "Corcitura" (Romanian or of Hungu) | 53,900 | Idem |

These prices are not to be varied except in relation to the quality, augmentations or diminutions being taken into account in the following manner according to whether the product is of a higher or inferior quality than that of base:

Wheat, rye, barley, and oats: 1 per cent. more or less than the base price for each kg. more or less of specific weight, and for each per cent. impurities less or more than those indicated for the base quality;

Maize: 1 per cent. more or less than the base price for each degree of humidity less or more, and 1 per cent. less for each further percentage of grains affected by rust or deterioration.

PRICES BY PRODUCTS

A) — Spot quotations ¹⁾

| DESCRIPTION | Sept. 13, 1940 | Sept. 6, 1940 | August 30, 1940 | August 23, 1940 | August 16, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|---|----------------------|---------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|---------------|--------------------|---------------|
| | | | | | | August 1940 | Sept. 1939 | Sept. 1938 | 1939-40 ") | 1938-39 ") |
| Wheat | | | | | | | | | | |
| Budapest: Tisza wheat, 78 kg. per hl. (pengő per 100 kg.) | 23.20 | 23.20 | 20.75 | 20.75 | 20.75 | 20.75 | 19.85 | 20.37 | 20.43 | 20.42 |
| Braila: Home-grown, good qual. (lei p. ql.) | 750 | 750 | 750 | 750 | 700 | 712 | 450 | 385 | 521 | 411 |
| Winnipeg: No. 1 Manitoba (cents p. 60 lb.) | ... | ... | ... | 72 1/2 | 72 1/2 ⁴⁾ | ... | 72 1/2 | 62 7/8 | 76 | 62 |
| Chicago: No. 2 Hard Winter (cents p. 60 lb.) | 79 | 77 1/2 | 74 1/2 | 70 1/2 | 69 3/4 | 63 1/2 | 86 1/2 | 66 3/4 | 92 7/8 | 70 1/2 |
| Minneapolis (cents per 60 lb.): | | | | | | | | | | |
| No. 1 Northern | 75 1/2 | 77 1/2 | 72 1/2 | 71 1/2 | 67 1/2 | 71 1/2 | 87 1/2 | 71 1/2 | 91 1/2 | 74 1/2 |
| No. 2 Amber Durum | 68 1/2 | 70 1/2 | 68 1/2 | 64 1/2 | 62 1/2 | 65 1/2 | 81 1/2 | 64 1/2 | 80 1/2 | 68 1/2 |
| New York: No. 2 Hard Winter (f.o.b. cents per 60 lb.) | 94 1/2 | 94 1/2 | 90 1/2 | 86 1/2 | 85 1/2 | 89 1/2 | 105 1/2 | 83 1/2 | 112 1/2 | 84 1/2 |
| Buenos Aires (a): No. 2 Hard, 80 kg. per hl. (paper pesos per 100 kg.) | 7.90 | 8.27 | 8.30 | 7.80 ⁵⁾ | 8.60 ⁶⁾ | 8.36 | 6.86 | 7.01 | 7.66 | 6.89 |
| Rye. | | | | | | | | | | |
| Budapest: Pest rye (pengő p. 100 kg.) | 19.20 | 19.20 | 16.72 | 16.72 | 16.72 | 16.72 | 14.12 | 14.98 | 15.62 | 14.34 |
| Winnipeg: No. 2 rye (cents p. 56 lb.) | ... | ... | ... | 41 1/2 | 39 1/2 ⁷⁾ | ... | 55 1/2 | 39 3/4 | 59 1/2 | 40 1/2 |
| Minneapolis: No. 2 rye (cents p. 56 lb.) | 43 1/2 | 44 1/2 | 40 1/2 | 39 1/2 | 38 1/2 | 40 1/2 | 51 1/2 | 41 1/2 | 56 1/2 | 44 |
| Barley. | | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) | 400 | 400 | 400 | 400 | 400 | 395 | 325 | 286 | 399 | 338 |
| Winnipeg: No. 4 West. (cents p. 48 lb.) ⁸⁾ | ... | ... | ... | 31 1/2 | 29 1/2 ⁹⁾ | ... | 42 1/2 | 32 1/2 | 43 | 34 1/2 |
| Chicago: Feeding (on sample; cents p. 48 lb.) | 44 | 42 | 42 | 41 1/2 | 41 1/2 | 41 1/2 | 42 1/2 | 44 1/2 | 42 1/2 | 40 1/2 |
| Minneapolis: No. 2 Feeding (cents p. 48 lb.) | 39 | 39 | 38 1/2 | 39 | 39 | 39 1/2 | 42 1/2 | 39 1/2 | 45 | 40 1/2 |
| Oats. | | | | | | | | | | |
| Winnipeg: No. 2 White (cents per 34 lb.) | ... | ... | ... | 27 1/2 | 28 1/2 ¹⁰⁾ | ... | 35 1/2 | 29 1/2 | 35 1/2 | 29 |
| Chicago: No. 2 White (cents per 32 lb.) | 32 1/2 | 32 | 31 | 30 1/2 | 29 1/2 ¹¹⁾ | 30 1/2 | 36 | 27 1/2 | 39 | 30 1/2 |
| Buenos Aires (a): No. 2 White, 40 kg. per hl. (paper pesos p. 100 kg.) | 4.10 | 4.10 | 4.10 | 4.15 | n. q. | 11)n. q. | 5.44 | 5.48 | 5.17 | 4.81 |
| Maize. | | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) | 510 | 510 | 507 | 507 | 507 | 512 | 357 | 368 | 365 | 362 |
| Chicago: No. 3 Yellow (cents p. 56 lb.) | 65 | 65 | 64 1/2 | 65 1/2 | 64 1/2 | 64 1/2 | 55 1/2 | 52 1/2 | 53 1/2 | 51 1/2 |
| Buenos Aires (a): Yellow Plata (paper pesos per 100 kg.) | 3.90 | 4.10 | 4.10 | 4.05 ¹²⁾ | 4.10 ¹³⁾ | 4.05 | 7.15 | 6.27 | 6.11 | 6.89 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — u. = nominal.
— (a) Thursday prices. — (b) Saturday prices.

¹⁾ In relation to Government price fixing, numerous series are omitted from this table; notes concerning them have been given in various issues of the Crop Report: United Kingdom: Nov. 1939, p. 1060; Italy: Dec. 1939, p. 2163; Germany: Feb. 1940, p. 142, and July 1940, p. 478. See also in this issue the notes concerning prices for new crop in France, Hungary, Italy and Romania, p. — ²⁾ Oct. 1939-May 1940: No. 2 Feeding barley; subsequently: Barley N. 3 Western. — ³⁾ Commercial season: August-July; for Maize: May-April. — ⁴⁾ Aug. 2: 71 1/2. — ⁵⁾ Price for Aug. 14. — ⁶⁾ Juli av. 9.19; June av.: 8.06. — ⁷⁾ Aug. 2: 42 1/2; July 26: 46 1/2. — ⁸⁾ Aug. 9: 400; Aug. 2: 375. — ⁹⁾ Aug. 2: 31 1/2. — ¹⁰⁾ Aug. 2: 30 1/2. — ¹¹⁾ As from June, 14; not quoted. — ¹²⁾ Aug. 9: 525; Aug. 2: 525. — ¹³⁾ July av.: 4.25; June av.: 3.95.

| DESCRIPTION | Sept. 13, 1940 | Sept. 6, 1940 | August 30, 1940 | August 23, 1940 | August 16, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|--|----------------------|---------------------|-----------------------|-----------------------|-----------------------|------------------------|---------------|---------------|--------------------|-----------|
| | | | | | | August 1940 | Sept. 1939 | Sept. 1938 | 1939 | 1938 |
| Linseed. | | | | | | | | | | |
| Buenos Aires (a): Current quality, 4 % impurities (paper pesos p. 100 kg.). | 10.70 | 10.75 | 10.55 | 10.65 | n. q. | (¹) n. q. | 18.11 | 13.29 | 15.12 | 14.31 |
| London (c.i.f., shipping current or fol- lowing month; £ per long ton): | | | | | | | | | | |
| La Plata | 12-0-0 | 11-12-6 | n. q. | n. q. | n. q. | n. q. | n. q. | 10-18-3 | *12-2-3 | 11-10-11 |
| Bombay | 16-15-0 | 16-15-0 | 17-2-6 | 17-2-6 | 17-2-6 | 17-2-6 | n. q. | *12-12-3 | *14-10-3 | 13-3-9 |
| Minneapolis No. 1 Northern (cts. p. 56 lb.). | 149 | 149 1/2 | 157 | 143 1/2 | 150 | 149 1/2 | 176 1/2 | 180 1/2 | 180 | 190 |
| Cotton. | | | | | | | | | | |
| New Orleans: Middling (cents p. lb.). | ... | 9.56 | 9.65 | 9.70 | 9.85 | 9.92 n. | 9.02 | 8.03 | n. 10.03 | 8.75 |
| New York: Middling (cents per lb.). | 9.82 | 9.92 | 9.93 | 9.86 | 9.92 | 10.05 n. | 9.33 | 8.17 | n. 10.34 | 9.00 |
| Liverpool (pence per lb.): | | | | | | | | | | |
| Middling, super good | ... | ... | ... | ... | ... | ... | n. 7.37 | 5.57 | * 8.05 | 5.88 |
| Middling | 8.26 | 8.33 | 8.23 | 8.18 | 8.19 | 8.05 | n. 6.67 | 4.79 | 7.47 | 5.17 |
| São Paulo, g.f. | ... | ... | ... | ... | ... | ... | n. 6.57 | 4.88 | * 7.44 | 5.14 |
| Broach, good staple, f.g. (1) | n. 6.13 | n. 6.25 | n. 6.14 | n. 6.10 | n. 6.17 | 6.15 | n. 5.38 | n. 3.73 | n. 6.36 | * n. 3.92 |
| C.P. Oomra, good staple, superfine (2) | 6.46 | 6.58 | 6.47 | 6.43 | 6.50 | 63.37 | n. 5.67 | 3.85 | 6.50 | * 4.11 |
| Giza 7, f.g.f. | 12.96 | 13.83 | 13.37 | 12.84 | n. q. | 12.51 | 8.13 | 7.52 | 9.58 | 7.22 |
| Upper Egyptian, f.g.f. | 12.23 | 12.95 | 12.71 | 12.35 | 13.03 | 12.33 | 7.43 | 6.13 | 9.32 | 6.00 |

B) — Quotations for future delivery

| DESCRIPTION | Sept. 13, 1940 | Sept. 6, 1940 | August 30, 1940 | August 23, 1940 | August 16, 1940 | MONTHLY AVERAGES | | | | |
|--|----------------------|---------------------|-----------------------|-----------------------|-----------------------|------------------|---------------|---------------|---------------|---------------|
| | | | | | | August 1940 | Sept. 1939 | Sept. 1938 | Sept. 1937 | Sept. 1936 |
| Wheat. | | | | | | | | | | |
| Winnipeg (cents p. 60 lb.): | | | | | | | | | | |
| delivery October | 73 1/2 | 73 1/2 | 73 1/2 | 73 1/2 | 73 1/2 | 73 1/2 | 72 1/2 | 62 | 126 1/2 | 106 |
| " December | 74 1/2 | 74 1/2 | 74 1/2 | 74 1/2 | 74 1/2 | 74 1/2 | 74 1/2 | 61 1/2 | 123 1/2 | 104 1/2 |
| Chicago (cents p. 60 lb.): | | | | | | | | | | |
| delivery September | 74 1/2 | 75 1/2 | 73 1/2 | 69 1/2 | 68 1/2 | 72 1/2 | 83 1/2 | 63 1/2 | 105 | 113 1/2 |
| " December | 76 1/2 | 77 | 75 1/2 | 71 1/2 | 70 1/2 | 73 1/2 | 82 1/2 | 64 1/2 | 106 1/2 | 112 1/2 |
| " May | 76 1/2 | 77 1/2 | 77 1/2 | 73 | 71 1/2 | 74 1/2 | 83 1/2 | 65 1/2 | 108 1/2 | 111 1/2 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery September | 7.98 | 8.00 (3) | 8.05 | 7.78 | n. q. | * 8.19 | — | — | 14.11 | — |
| " October | 7.87 | 8.06 (3) | 8.30 | 7.95 | n. q. | * 8.38 | 6.97 | 6.84 | 14.00 | 10.98 |
| Rye. | | | | | | | | | | |
| Winnipeg (cents p. 56 lb.): | | | | | | | | | | |
| delivery October | 42 1/2 | 43 1/2 | 42 1/2 | 42 1/2 | 40 1/2 | 42 1/2 | 55 1/2 | 40 | 89 1/2 | 68 1/2 |
| " December | 43 1/2 | 44 1/2 | 43 1/2 | 43 | 41 1/2 | 43 1/2 | 54 1/2 | 40 1/2 | 88 1/2 | 67 1/2 |
| " May | 45 1/2 | 46 1/2 | 45 | 45 1/2 | — | — | 56 1/2 | 42 1/2 | 89 1/2 | 68 1/2 |
| Chicago (cents p. 56 lb.): | | | | | | | | | | |
| delivery September | 40 | 40 1/2 | 39 1/2 | 37 1/2 | 37 1/2 | 39 1/2 | 50 1/2 | 41 1/2 | 81 1/2 | 83 1/2 |
| " December | 43 | 43 1/2 | 42 | 40 1/2 | 40 1/2 | 42 1/2 | 52 1/2 | 43 1/2 | 79 1/2 | 81 1/2 |
| " May | 45 1/2 | 46 1/2 | 45 | 43 1/2 | 43 1/2 | 45 1/2 | 55 1/2 | 44 1/2 | 79 | 79 1/2 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. —
n. = nominal. — (a) Thursday prices.

(1) As from March 15, 1939: "fair staple". — (2) As from June, 1940: not quoted. — (3) Shipping October. — (4) Commercial season: August-July.

| DESCRIPTION | Sept. 13, 1940 | Sept. 6, 1940 | August 30, 1940 | August 23, 1940 | August 16, 1940 | MONTHLY AVERAGES | | | | |
|--|--------------------------------|-----------------------------------|--------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|
| | | | | | | August 1940 | Sept. 1939 | Sept. 1938 | Sept. 1937 | Sept. 1936 |
| Barley. | | | | | | | | | | |
| Winnipeg (cents p. 48 lb.): | | | | | | | | | | |
| delivery October | 34 ¹ / ₈ | 33 ¹ / ₈ | 33 ¹ / ₈ | 33 ⁷ / ₈ | 31 ¹ / ₈ | 33 ¹ / ₈ | 45 ¹ / ₈ | 36 | 59 ¹ / ₈ | 59 ¹ / ₈ |
| " December | 34 ¹ / ₈ | 34 | 33 ¹ / ₈ | 33 ¹ / ₈ | 30 ¹ / ₈ | 32 ¹ / ₈ | 44 ¹ / ₈ | 35 ⁷ / ₈ | 56 ¹ / ₈ | 57 ¹ / ₈ |
| " May | 45 ¹ / ₈ | 35 ¹ / ₈ | 34 ¹ / ₈ | 35 ¹ / ₈ | — | — | 46 | 37 ¹ / ₈ | 56 ¹ / ₈ | 57 |
| Minneapolis (cents p. 48 lb.): | | | | | | | | | | |
| delivery September | ... | ... | ... | 33 ¹ / ₈ | 31 ¹ / ₈ | ... | 39 ⁷ / ₈ | 33 | 51 ¹ / ₈ | 78 ¹ / ₈ |
| " December | ... | ... | ... | 34 ¹ / ₈ | 33 ¹ / ₈ | ... | 41 | 32 ⁷ / ₈ | 45 ¹ / ₈ | 71 ¹ / ₈ |
| Oats. | | | | | | | | | | |
| Winnipeg (cents p. 34 lb.): | | | | | | | | | | |
| delivery October | 30 ¹ / ₈ | 29 ¹ / ₈ | 28 ¹ / ₈ | 28 ¹ / ₈ | 27 ¹ / ₈ | 28 ¹ / ₈ | 35 ¹ / ₈ | 29 ¹ / ₈ | 50 ¹ / ₈ | 45 ¹ / ₈ |
| " December | 28 ¹ / ₈ | 27 ¹ / ₈ | 27 ¹ / ₈ | 26 ⁷ / ₈ | 25 ¹ / ₈ | 26 ¹ / ₈ | 34 ¹ / ₈ | 28 ¹ / ₈ | 47 ¹ / ₈ | 44 ¹ / ₈ |
| " May | 28 ¹ / ₈ | 28 ¹ / ₈ | 28 ¹ / ₈ | 28 | 26 ¹ / ₈ | 28 | 35 ¹ / ₈ | 29 ¹ / ₈ | 47 ¹ / ₈ | 45 ¹ / ₈ |
| Chicago (cents p. 32 lb.): | | | | | | | | | | |
| delivery September | 29 ¹ / ₈ | 29 ¹ / ₈ | 29 | 27 ¹ / ₈ | 27 ¹ / ₈ | 28 ¹ / ₈ | 35 ¹ / ₈ | 24 ¹ / ₈ | 31 ¹ / ₈ | 42 ¹ / ₈ |
| " December | 29 ¹ / ₈ | 29 ¹ / ₈ | 29 ¹ / ₈ | 28 ¹ / ₈ | 27 ¹ / ₈ | 29 | 34 | 25 ¹ / ₈ | 30 ¹ / ₈ | 42 ¹ / ₈ |
| " May | 30 ¹ / ₈ | 30 ¹ / ₈ | 30 ¹ / ₈ | 29 ¹ / ₈ | 28 ¹ / ₈ | 29 ¹ / ₈ | 34 ¹ / ₈ | 26 ¹ / ₈ | 31 ¹ / ₈ | 43 ¹ / ₈ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery September | 4.00 | 4.00 | 4.20 | 4.20 | — | 4.10 | 4.78 | 5.44 | — | — |
| Maize. | | | | | | | | | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | | |
| delivery September | 63 ¹ / ₈ | 63 | 61 ¹ / ₈ | 60 ¹ / ₈ | 60 ¹ / ₈ | 60 ¹ / ₈ | 55 ¹ / ₈ | 51 ¹ / ₈ | 106 ¹ / ₈ | 113 ¹ / ₈ |
| " December | 56 ¹ / ₈ | 57 | 57 ¹ / ₈ | 55 ¹ / ₈ | 54 ¹ / ₈ | 56 ¹ / ₈ | 53 ¹ / ₈ | 49 ¹ / ₈ | 63 ¹ / ₈ | 95 ¹ / ₈ |
| " May | 58 | 57 ¹ / ₈ | 58 ¹ / ₈ | 55 ¹ / ₈ | 55 ¹ / ₈ | 57 ¹ / ₈ | 56 ¹ / ₈ | 51 ¹ / ₈ | 64 ¹ / ₈ | 90 ¹ / ₈ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery September | 4.02 | 4.23 ¹ / ₈ | 4.32 | 4.34 | n. q. | 4.33 | — | 6.33 | 6.68 | 6.13 |
| " October | n. q. | 4.41 ¹ / ₈ | 4.45 | 4.41 | n. q. | 4.42 | 7.04 | 6.44 | 6.79 | 6.19 |
| Linseed. | | | | | | | | | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery September | — | 10.50 ¹ / ₈ | 10.60 | 10.55 | n. q. | 13.00 | — | — | 16.11 | 15.02 |
| " October | 10.74 | 10.71 ¹ / ₈ | 10.91 | 10.75 | n. q. | 13.14 | 17.44 | 13.46 | 16.05 | 14.96 |
| " November | ... | 10.90 | 11.08 | 10.85 | — | — | 17.22 | 13.34 | 15.99 | 14.95 |
| Duluth (cents p. 56 lb.): | | | | | | | | | | |
| delivery September | ... | ... | ... | 143 ¹ / ₈ | n. 149 | ... | — | 173 | 200 | 207 ¹ / ₈ |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. Quotation of August, 29.

LATEST INFORMATION**Commercial cereals and oilseeds in store in Argentina.**

| PRODUCTS | Sept. 1, 1940 | Sept. 1, 1939 | Sept. 1, 1938 | Sept. 1, 1940 | Sept. 1, 1939 | Sept. 1, 1938 |
|--------------------------------------|-------------------------|------------------|------------------|-------------------------|------------------|------------------|
| | (thousand centals) | | | (thousand bushels) | | |
| Wheat in the ports | 10,856 | (²) | 6,129 | 18,092 | (²) | 10,215 |
| Wheat in other positions | 15,067 | (²) | 17,477 | 25,112 | (²) | 29,128 |
| TOTAL | (¹) 25,923 | (¹) | 23,606 | (¹) 43,204 | (¹) | 39,343 |
| Rye | 4,754 | 1,164 | 202 | 8,490 | 2,079 | 360 |
| Barley | 4,574 | 1,219 | 627 | 9,530 | 2,539 | 1,306 |
| Oats | 3,224 | 2,857 | 1,003 | 10,074 | 8,928 | 3,134 |
| Maize in the ports | 5,273 | 5,627 | 2,480 | 9,416 | 10,049 | 4,429 |
| Maize in other positions | 10,263 | 9,257 | 7,671 | 18,326 | 16,530 | 13,698 |
| TOTAL | 15,536 | 14,884 | 10,151 | 27,742 | 26,579 | 18,127 |
| Canaryseed | 509 | 332 | 262 | 908 | 592 | 468 |
| Linseed in the ports | 3,114 | 2,145 | 2,982 | 5,561 | 3,831 | 5,324 |
| Linseed in other positions | 2,467 | 2,065 | 3,093 | 4,406 | 3,687 | 5,524 |
| TOTAL | 5,581 | 4,210 | 6,075 | 9,967 | 7,518 | 10,848 |
| Sunflowerseed | 2,556 | 1,344 | — | 9,129 | 4,800 | — |

(¹) Including 20,460 thousand centals (34,099 thousand bushels) of the 1939-40 Crop. — (²) Figures for wheat in store have been withheld by governmental order.

APPENDIX**THE SECOND WORLD AGRICULTURAL CENSUS****The Census of Agricultural Holdings in Germany in 1939.**

The first results of the agricultural and forestry census taken on May 17, 1939 which appeared at page 274 of the March issue of the Bulletin, were revised as regards the number of holdings and completed with the corresponding data of the surfaces.

| Total area of holdings | | | Holdings | | Total area of holdings | |
|---|--------------------------|--|-----------|----------------|------------------------|----------------|
| | | | Number | % of the total | Number | % of the total |
| 0.5 and not exceeding 1 ha. | (1.24 - 2.47 acres) | | 567,924 | 14.6 | 999,222 | 0.7 |
| 1 " " " 2 " | (2.47 - 4.94 ") | | 585,788 | 15.0 | 2,072,271 | 1.6 |
| 2 " " " 5 " | (4.94 - 12.36 ") | | 943,837 | 24.2 | 7,728,603 | 5.9 |
| 5 " " " 10 " | (12.36 - 24.71 ") | | 746,718 | 19.1 | 13,185,455 | 10.0 |
| 10 " " " 20 " | (24.71 - 49.42 ") | | 596,542 | 15.3 | 21,018,775 | 16.0 |
| 20 " " " 50 " | (49.42 - 123.55 ") | | 354,578 | 9.1 | 25,890,616 | 19.6 |
| 50 " " " 100 " | (123.55 - 247.11 ") | | 64,705 | 1.6 | 10,659,543 | 8.1 |
| 100 " " " 200 " | (247.11 - 494.22 ") | | 20,900 | 0.6 | 7,076,278 | 5.4 |
| 200 " " " 500 " | (494.22 - 1,235.54 ") | | 12,623 | 0.3 | 9,862,288 | 7.5 |
| 500 " " " 1,000 " | (1,235.54 - 2,471.09 ") | | 4,540 | 0.1 | 7,672,102 | 5.8 |
| 1,000 hectares and over (2,471.09 acres and over) | | | 3,688 | 0.1 | 25,527,111 | 19.4 |
| TOTAL . . . | | | 3,901,843 | 100.0 | 131,692,264 | 100.0 |

The comparison with the preceding statement can be made only in regard to the territory of the German Reich within the frontiers of 1937, i. e., including the Saar Territory.

| Total area of holdings | | | Holdings | | | Total area of holdings in ha. | | |
|---|--------------------------|--|-----------|-----------|-------------------------|-------------------------------|-------------|-------------------------|
| | | | 1939 | 1933 | Modifications 1933 in % | 1939 | 1933 | Modifications 1933 in % |
| 0.5 and not exceeding 1 ha. | (1.24 - 2.47 acres) | | 482,812 | 366,839 | + 31.6 | 846,410 | 664,894 | + 27.3 |
| 1 " " " 2 " | (2.47 - 4.94 ") | | 476,264 | 482,379 | - 1.3 | 1,679,790 | 1,684,421 | - 0.3 |
| 2 " " " 5 " | (4.94 - 12.36 ") | | 762,621 | 796,790 | - 4.3 | 6,249,646 | 6,453,694 | - 3.2 |
| 5 " " " 10 " | (12.36 - 24.71 ") | | 619,149 | 621,952 | - 0.5 | 10,944,707 | 10,818,783 | + 1.2 |
| 10 " " " 20 " | (24.71 - 49.42 ") | | 486,329 | 451,663 | + 7.7 | 17,106,938 | 15,531,784 | + 10.1 |
| 20 " " " 50 " | (49.42 - 123.55 ") | | 281,719 | 267,310 | + 5.4 | 20,713,744 | 19,656,953 | + 5.4 |
| 50 " " " 100 " | (123.55 - 247.11 ") | | 55,061 | 54,572 | + 0.9 | 9,061,094 | 8,956,933 | + 1.2 |
| 100 " " " 200 " | (247.11 - 494.22 ") | | 16,897 | 16,600 | + 1.8 | 5,697,543 | 5,595,314 | + 1.8 |
| 200 " " " 500 " | (494.22 - 1,235.54 ") | | 10,413 | 10,623 | - 2.0 | 8,206,584 | 8,193,823 | + 0.2 |
| 500 " " " 1,000 " | (1,235.54 - 2,471.09 ") | | 3,846 | 3,919 | - 1.9 | 6,470,151 | 6,662,592 | - 2.9 |
| 1,000 hectares and over (2,471.09 acres and over) | | | 2,846 | 2,807 | + 1.4 | 18,486,415 | 18,496,077 | - 0.1 |
| TOTAL . . . | | | 3,197,957 | 3,075,454 | + 4.0 | 105,463,022 | 102,715,268 | + 2.7 |

1) From 0.51 ha to under 1 ha. (1.24 - 2.47 acres).

The variations resulting from this table show only to a certain measure the actual changes in the size of the holdings. They are also due, to a considerable extent, to technical changes and improvements in the method in the

taking of the census. It must be noticed particularly that in lieu of the size group "from 0.51 to 1 ha.", the size group "from 0.5 to less than 1 ha.", has been used again, as in the past. The exactness of the results has been considerably increased by a preliminary survey and a revision of the methods of research. This was a great advantage, especially as regards the size group mentioned. A considerable increase is noticeable in medium size holdings, while some decreases are registered in the small and large holdings.

The General Agricultural Census in Norway, 1939.

The Norwegian Central Bureau of Statistics has published (1) the first results of the general agricultural census taken in that country on June 20th, 1939.

The census has embraced all holdings where agriculture properly speaking, horticulture and cattle-breeding (including the breeding of furbearing animals) were carried on, whatever their size. Data were collected, with less detail, in urban districts as well.

The number of holdings covered by the census was 331,702, of which 328,181 had arable land, against 298,360 reckoned in 1929; this means an increase of about 10 per cent.

The following table shows the utilisation of arable land in rural communes according to the 1939 census, the figures being compared with those of the 1929 census.

Utilisation of arable land.

| Crops | 1939 acres | 1929 acres | Increase (+) or decrease (—) in 1939 % | |
|---|------------------|------------------|--|------------|
| | | | | |
| Winter wheat | 6,432 | 1,920 | + | 234.8 |
| Spring wheat | 95,409 | 27,614 | + | 245.5 |
| Winter rye | 3,828 | 14,061 | — | 72.8 |
| Spring rye | 4,020 | 4,258 | — | 5.6 |
| Barley | 115,583 | 132,100 | — | 12.5 |
| Oats | 215,044 | 238,727 | — | 9.9 |
| Meslin | 12,094 | 13,668 | — | 11.5 |
| Peas | 1,463 | 2,790 | — | 47.5 |
| Green fodder | 30,903 | 35,972 | — | 14.1 |
| Potatoes | 125,267 | 114,429 | + | 9.5 |
| Turnips for fodder | 24,597 | 32,947 | — | 25.3 |
| Kohlrabi | 20,310 | 9,242 | + | 119.8 |
| Cabbage | 3,489 | 3,067 | + | 13.8 |
| Carrots | 2,627 | 1,940 | + | 35.4 |
| Strawberries | 1,752 | 1,381 | + | 26.9 |
| Raspberries | 1,159 | 1,122 | + | 3.3 |
| Other field and garden crops | 56,793 | 21,583 | + | 163.1 |
| Fallow land | 7,132 | 16,984 | — | 58.0 |
| Meadows on arable land, for hay | 1,220,017 | 1,186,610 | + | 2.8 |
| Meadows on arable land, for grazing | 88,762 | 55,765 | + | 59.1 |
| <i>Total arable land</i> | <i>2,036,681</i> | <i>1,916,180</i> | <i>+</i> | <i>6.3</i> |
| Other meadows, for hay | 586,901 | 729,634 | — | 19.6 |
| Other meadows, for grazing | 134,521 | 101,858 | + | 32.0 |
| <i>Total agricultural land</i> | <i>2,758,103</i> | <i>2,747,672</i> | <i>+</i> | <i>0.4</i> |

(1) *Statistiske Meddelelser*, 1940, Numbers 3, 4 and 5.

The census of fruit trees shows a very notable increase during the last ten years, their number, including those found in urban districts, having passed from 2,513,000 in 1929 to 3,768,000 in 1939, with an increase of 49.9 per cent. The most important increase (76 per cent.) has taken place in the case of plum trees, while the number of apple trees has increased by 59 per cent., that of pear trees by 44 per cent. and that of cherry trees only by 5 per cent. The total number of apple trees found in 1939 has reached 1,883,000, of which 847,000 were given as bearing summer and autumn apples, and 1,036,000 as bearing winter apples.

As to berry bushes, their total number has decreased by 5 per cent., passing from 4,700,000 in 1929 to 4,400,000 in 1939. The decrease extended to all kinds of berry bushes: red currants, gooseberries and black currants.

The census included also data relating to nurseries, but these data have not been worked out as yet.

Data relating to the number of cattle and farm-yard animals kept in rural communes in 1939 and in 1929, are summarized in the following tables.

Numbers of cattle in rural communes.

| Classification | 1939 | 1929 | Increase (+) or decrease (—) in 1939 per cent |
|--|------------------|------------------|---|
| Horses under one year old | 16,135 | 6,703 | + 140.7 |
| Horses from one to three years old . . . | 31,876 | 13,203 | + 141.4 |
| Horses from three to five years old . . . | 25,631 | 13,128 | + 95.2 |
| Horses from five to sixteen years old . . | 71,022 | 107,918 | — 34.2 |
| Horses over sixteen years old | 59,267 | 36,217 | + 63.6 |
| <i>Total . . .</i> | <i>203,931</i> | <i>177,169</i> | <i>+ 15.1</i> |
| Calves under one year old | 329,329 | 243,084 | + 35.5 |
| Oxen and bulls, from one to two years old | 74,584 | 57,726 | + 29.2 |
| Oxen and bulls over two years old . . . | 14,081 | 7,759 | + 81.5 |
| Heifers | 172,686 | 160,478 | + 7.6 |
| Cows | 864,336 | 755,135 | + 14.5 |
| <i>Total . . .</i> | <i>1,455,016</i> | <i>1,224,182</i> | <i>+ 18.9</i> |
| Sheep under one year old | 856,999 | 726,952 | + 17.9 |
| Sheep over one year old | 886,803 | 806,063 | + 10.0 |
| <i>Total . . .</i> | <i>1,743,802</i> | <i>1,533,015</i> | <i>+ 13.7</i> |
| Goats under one year old | 86,326 | 120,465 | — 28.3 |
| Goats over one year old | 162,590 | 203,212 | — 20.0 |
| <i>Total . . .</i> | <i>248,916</i> | <i>323,677</i> | <i>— 23.1</i> |
| Pigs under four months old | 201,302 | 189,415 | + 6.3 |
| Pigs over four months old, for fattening. | 113,008 | 60,529 | + 86.7 |
| Pigs over four months old for breeding: | | | |
| boars | 2,260 | 2,279 | — 0.8 |
| Pigs over four months old for breeding: | | | |
| sows | 45,383 | 36,816 | + 23.3 |
| <i>Total . . .</i> | <i>361,953</i> | <i>289,039</i> | <i>+ 25.2</i> |

In urban districts, there were counted, in 1939, 2,110 horses (against 4,470 in 1929), 4,600 cattle (including 3,700 milch cows), 1,900 sheep, 240 goats and 4,200 pigs.

Numbers of farm-yard animals in rural communes.

| Classification | 1939 | 1929 | Increase (+) or decrease (-) in 1939 % |
|--|-----------|-----------|--|
| Fowls adult | 3,422,368 | 2,903,606 | + 17.9 |
| Fowls young | 2,264,292 | 1,567,648 | + 44.4 |
| Ducks adult. | 7,175 | 10,413 | — 31.1 |
| Ducks young | 14,510 | 8,997 | + 61.3 |
| Geese adult. | 3,438 | 9,240 | — 62.8 |
| Geese young | 10,340 | 14,932 | — 30.8 |
| Turkeys adult | 4,877 | 6,181 | — 21.1 |
| Turkeys young | 8,962 | 8,524 | + 5.1 |
| Rabbits under six months old | 68,052 | 186,785 | — 49.2 |
| Rabbits over six months old. | 26,928 | | |

The number of beehives in rural communes was 38,790 in 1939 against 21,313 in 1929, showing an increase of 82 per cent.

As to fur-bearing animals, a census of these had already been taken in 1939; since then, the number of holdings where such animals were bred has increased from about 17,000 to about 21,000. The total number of silver-foxes, including the breedings in urban districts, was, on June 20th 1939, 493,000, of which 176,500 were adult, and 316,700 young ones, against 391,000 in 1936. The increase was relatively larger in the case of blue foxes, which had passed from 8,600 in 1936 to 29,000 in 1939. Platinum-foxes were 4,837, of which 488 were adult ones. The number of minks has also increased, from 6,700 in 1936 to over 26,000 in 1939.

The 1939 census embraced as well a number of data relating to machinery and implements used in rural holdings. These holdings kept 4,482 farmyard manure spreaders and 6,470 chemical fertilizer spreaders. The number of sowing machines has increased from 27,012 in 1929 to 30,847 in 1939, that of reaper-mowers from 90,901 to 98,881, that of reaper-binders from 6,789 to 7,861, that of potato-diggers from 14,015 to 17,429. There were numbered 82,181 mechanical rakes, 11,839 tedders, 14,086 grain cleaning threshers and 24,884 other threshers. 1166 holdings had mechanical dairy equipments. The number of cream separators was 124,643. That of tractors had passed from 889 in 1929 to 2,831 in 1939, and that of rotary tillers was 341. The number of reckoned incubators was 4,463, out of which 1645 were found in the Rogaland.

Data relating to a number of other matters covered by the 1939 agricultural census are being worked out at present.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following explanations refer to crop conditions quoted in the crop notes and in the tables. — Crop condition according to the system of the country: Germany, including Ostmark and Sudetenland, Bohemia and Moravia (Protectorate); Hungary and Luxemburg: 1 = excellent, 2 = good, 3 = average, 4 = poor, 5 = very poor; Finland: 8 = very good, 6 = above the average, 5 = average; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = poor; Estonia, Latvia, Lithuania, Poland, Romania and Sweden: 5 = excellent, 4 = good, 3 = average, 2 = poor, 1 = very poor; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; Portugal: 100 = excellent, 80 = good, 60 = average, 40 = poor, 20 = very poor; Switzerland: 100 = excellent, 90 = very good, 75 = good, 60 = fairly good, 50 = average, 40 = rather poor, 30 = poor, 10 = very poor; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = poor; Canada: 100 = crop condition promising a yield equivalent to the average yield of a long series of years; United States: 100 = crop condition which promises a normal yield; Egypt: 100 = crop condition which promises a yield equal to the average yield of the last five years. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

NOTE: The countries are listed throughout by continents (Europe, followed by the U. S. S. R., America, Asia, Africa and Oceania) in the French alphabetical order. In the tables the Northern Hemisphere precedes the Southern Hemisphere.

See latest information at the end of the Crop Report.

VEGETAL PRODUCTION

WORLD WHEAT PRODUCTION AND SUPPLIES IN 1940-41.

The world wheat production in 1940.

Although official information on the wheat production in 1940 is lacking for a large number of countries of the northern hemisphere, and no forecast on the production in 1940-41 for the countries of the southern hemisphere has been published, the Institute has deemed it useful to calculate the probable estimates on the wheat production in the different continents, on the basis of the few available official data, filling the gaps where data are lacking, with approximate evaluations based on information gathered from various sources and dealing with the trend of the season and the probable crop results in the different countries. It is obvious that these conjectural estimates are far from being as strictly reliable as was all information normally given out by the Institute, when based on officially and timely data furnished by the Governments. Still this information has the advantage of giving a definite, though rough indication on the wheat situation in the different continents and in the world. The fact that these tentative estimates have been made in the most objective way and after the most careful control of the available information, confers to them the character of the

best reliability attainable under the present circumstances. At the same time this information does not infringe on the reserve and discretion which some countries are employing in regard to their services of economic information, as it deals with continental groups, while detailed data concerning individual countries are omitted for obvious reasons.

WHEAT. — *World Production by Continents.*

(in million bushels).

| PERIOD | North & Cent. America | South America | Europe (1) | Asia (2) | Africa | Oceania | Total (2) | U. S. S. R. |
|---------------------------|-----------------------------|------------------|---------------|-------------|--------|---------|--------------|-------------|
| Averages: | | | | | | | | |
| 1909-13 | 900 | 180 | 1,360 | 490 | 102 | 98 | 3,130 | 757 |
| 1923-27 | 1,210 | 278 | 1,244 | 497 | 108 | 143 | 3,480 | 677 |
| 1928-32 | 1,288 | 290 | 1,429 | 536 | 128 | 189 | 3,860 | 797 |
| 1933-37 | 901 | 280 | 1,580 | 580 | 133 | 166 | 3,640 | 1,206 |
| Year: | | | | | | | | |
| 1938 | 1,304 | 400 | 1,822 | 680 | 140 | 162 | 4,508 | 1,494 |
| 1939 | 1,260 | 176 | 1,705 | 694 | 169 | 220 | 4,224 | ... |
| 1940 (forecast) | 1,367 | 276 | 1,415 | 705 | 147 | 132 | 4,042 | ... |

(1) Excluding the U. S. S. R. — (2) Excluding U. S. S. R., China, Iraq and Iran.

On the basis of these estimates, wheat production in Europe appears to be considerably lower than that of last year, and even more so as compared to the 1938 production (17 and 22 per cent. respectively). Both these years registered very high crops. The decrease as compared with the average during the period 1933-1937, does not exceed 10 per cent. The chief causes for the low harvest in 1940 are: the direct and indirect damages to the crops on account of the war, and above all, the adverse weather conditions which prevailed during most of the year. As mentioned in the bulletin last month, it must be noticed that, as far as the food situation of the continent is concerned, the bread and fodder cereal crops—rye, oats and maize—were generally good, and that the potato and other food crops appear to be quite abundant. The production in the Soviet Union, about which no reliable data are available, seems to have been satisfactory: better, in any case, than that of 1939.

In North America the production was very good, among the highest registered so far, it being only lower than the record crop of 1928. Surprising results were obtained in the United States from winter wheat whose conditions, at the beginning of the year, had been extremely bad: so bad in fact, that, on account of persistent drought, a large proportion of the seeds had not germinated and seemed completely lost. The return of favourable weather caused the germination to take place in the Spring. The growth and ripening of the plants were henceforward greatly helped by prevailing favourable weather. The first estimate on winter wheat last December was for a crop of only 400 million bushels: on the basis of the latest estimates the production amounts to 556 millions, that is, a

level nearly as high as that of last year and of the average, in spite of the considerable decrease of the acreage sown to wheat. Spring wheat has also yielded a good crop. The latest estimate published this month by the Department of Agriculture in Washington points to a production of over 236 million bushels, i. e., an increase of nearly $1/4$ as compared with 1939, and one half as compared with the average of the five preceding years. Thus the whole of the winter and spring wheat production in the United States is of 792 million bushels, i. e., 5 per cent., above the 1939 production and 10 per cent. above the average.

Canada has also registered this year an excellent crop, nearly as high as the absolute maximum registered in 1928. According to the Department of Agriculture at Ottawa, the production is of about 561 million bushels, 15 per cent. above the very good production last year and more than double the low average of the five preceding years.

The wheat production in the Asiatic continent appears also to be very abundant. The data appearing in the table do not take into account China, Iraq and Iran, because these countries do not possess official data or they publish them with a great delay. The two greatest producing countries, India and Turkey, both registered a good crop. In India there has been an increase of $1/10$ over last year's production which was average; the production in Turkey was nearly as high as that of 1939, which was the highest ever attained in that country. In Japan the production seems to have reached the record registered last year. In Manchukuo the production has been rather low, and below the average. In the mandated countries in the East, a good production has been registered. On the whole the wheat production in Asia was very high, it being slightly above that of the last two years, when the production in this Continent reached its maximum and over 20 per cent. above the average of the quinquennium 1933-37. According to some unofficial information, the Chinese crop this year appears slightly higher than the rather low one of 1939.

In Africa the 1940 wheat crop is also abundant, but lower than last year. Egypt registered a very good crop, even better than the good one of 1939. The other countries of the northern zone appear to have had satisfactory results, even though they are considerably lower than the record attained in 1939. In the South African Union the forecast is for an average production. On the whole, the 1940 wheat production in Africa, though about 12 per cent. lower than last year, is one of the highest as yet registered on that continent.

At present, the forecasts for the production in the largest wheat producing countries of the southern hemisphere, where the crops are in the most critical period of their vegetative cycle, seem to point on the whole to rather low yields. In Argentina the acreage sown to wheat has been slightly reduced (3.1 per cent. compared with last year, and 6.5 per cent. as compared with the average). Sowings, germination and the first period of growth were not satisfactory owing to excessive rains. In August and September weather improved and at the beginning of October the crop conditions appeared good. If up to the time of harvesting, weather conditions remain normal, an average crop may be expected: higher, anyway, than the very low one last year. It seems that in Australia there has also been a reduction of the area sown to wheat, which was occasioned

by persistent droughts that hindered plowing, sowings, and, in some zones, prevented the germination of the seeds. Nearly everywhere the development of the plants was very weak, owing to the persistent lack of abundant rains. The little rain that fell from time to time was insufficient for the needs of the vegetation, and most of the fields appeared in a bad condition. The forecast is for a production far lower than the average.

Thus the 1940 production appears quite different in the various continents: excellent in North America and Asia, good in Africa, average in South America, poor in Europe and Oceania. The whole world production may be considered a good average, because, although it is nearly 5 per cent. lower than last year and 10 per cent. lower than in 1938, still it is considerably higher than all the preceding averages, i. e., 11 per cent. above the average 1933-37, 5 per cent. above the average 1928-32 and 16 per cent. above the average 1923-27.

World wheat supplies in 1940-41.

On the basis of the distribution of old wheat stocks and of the new production, it would now be interesting to examine the statistical situation of the world exportable wheat surpluses in the over-producing countries and compare it with the import requirements of the importing countries. Unfortunately the scarcity of available information, the difficulty of making estimates in the present state of international relations and the extreme delicacy of all questions related to supplies during the war period, do not allow as detailed a survey as would be necessary. Some fundamental data, however, and some characteristic trend of the world wheat situation can be clearly indicated. First of all let us see what the situation of the stocks is. At the beginning of the consumption campaign of 1940-41, the world wheat stocks from old harvests were enormous; certainly the highest ever registered before, representing the surpluses left from the big world crops of 1938 and 1939. Taking the four great wheat exporting countries all together (Canada, United States, Argentina and Australia), it is calculated that the stocks from old harvests available at August 1, 1940, amounted to over 740 million bushels as compared with 570 millions at August 1, 1939 and a maximum of 700 millions registered in 1933. The new production of these four countries, minus the quantities needed for domestic requirements (consumption and minimum carry-over) shows an exportable surplus of about 590 millions; so that the total exportable surpluses available from the new and old crops in the four countries, amount to 1,330 millions. However small the surplus of the Danubian countries may be, —owing to this year poor crop—, it may be estimated that the quantity of wheat which the minor exporting countries (Danubian countries, French North Africa, India, Soviet Union, Turkey, etc.) can put at the disposal of the demand of the importing countries during the present season must be on the whole considerably over 40 million bushels. If the quantities afloat at the beginning of the season are also taken into account, the world exportable supplies in 1940-41 should amount to about 1,400 million bushels, i. e., nearly equivalent to the maximum so far registered in 1928-29.

But in 1928-29 the world import demand was very high; so high, in fact, that world imports amounted to 930 million bushels, thus absorbing a large part of the surplus. From that time the demand has steadily decreased, and in the last years it fluctuated within very low limits, between 500 and 600 million bushels.

In the present season, considering that so far all the continental part of Europe is cut out of the most important centers of wheat supply, it must be expected that, as long the present state of affairs lasts, the world imports will be among the lowest in the course of the latest years. We may not be very far from the truth if we estimate, in such a case, the world import requirements at about 450 million bushels. Thus, at the end of the season, i. e., at August 1, 1941, wheat stocks in the great exporting countries, and especially in North America, will be extremely heavy.

G. CAPONE.

CURRENT INFORMATION FROM VARIOUS COUNTRIES ON WHEAT, RYE, BARLEY AND OATS.

Bulgaria: Towards the middle of September the gathering in of cereals had been effected everywhere. This year crop appears poorer than last year. The weather which at the beginning of September was rather rainy and cool, turned to warmer and sunshiny in the second part of the month. Working in the fields and sowings of winter cereals have started under favourable conditions.

Denmark: According to recent rectifications, area and production of the main cereals in 1939, compared with those of 1938 and the average of the five preceding years have been as follows.

| | 1939 | 1938 | Average 1933-37 | % 1939 1938 = 100 | % 1939 Average = 100 |
|-------------------------------|---------|-------|--------------------|-------------------------|----------------------------|
| <i>Area (thousand acres).</i> | | | | | |
| Wheat | 329.9 | 324.9 | 293.6 | 101.5 | 112.4 |
| Rye | 338.5 | 358.6 | 358.4 | 94.4 | 94.5 |
| Barley | 1,040.3 | 982.1 | 875.8 | 105.9 | 118.8 |
| Oats | 929.9 | 926.2 | 931.6 | 100.4 | 99.8 |
| Meslin | 751.0 | 745.9 | 809.8 | 100.7 | 92.7 |

Production.

(Thousand centals).

| | | | | | |
|------------------|----------|----------|----------|------|-------|
| Wheat | 9,244.0 | 10,161.1 | 7,662.3 | 91.0 | 120.6 |
| Rye | 5,322.0 | 6,252.3 | 5,556.0 | 85.1 | 95.8 |
| Barley | 27,531.4 | 29,970.0 | 22,131.8 | 91.9 | 124.4 |
| Oats | 22,286.6 | 25,225.4 | 21,548.1 | 88.3 | 103.4 |
| Meslin | 15,306.7 | 17,533.4 | 16,960.0 | 87.3 | 90.3 |

(Thousand bushels).

| | | | | | |
|------------------|----------|----------|----------|------|-------|
| Wheat | 15,406.4 | 16,934.9 | 12,770.2 | 91.0 | 120.6 |
| Rye | 9,503.6 | 11,164.9 | 9,921.4 | 85.1 | 95.8 |
| Barley | 57,358.1 | 62,438.1 | 46,108.7 | 91.9 | 124.4 |
| Oats | 69,645.1 | 78,828.7 | 67,337.3 | 88.3 | 103.4 |
| Meslin | 26,391.2 | 30,230.4 | 29,241.4 | 87.3 | 90.3 |

Finland: The weather during the month of September might be said to have been normal, although it rained frequently and abundantly causing some damages. The forecast is for a lower yield than last year. The storing of the cereals is not being effected under favourable conditions, and the quality of the crop is judged only average.

Areas under cereals.

| COUNTRIES | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | |
|------------------------------|-----------|-----------|----------------------------|---------------|------------------|-----------|-----------|----------------------------|---------------|------------------|--|
| | | | | 1939 = 100 | Average = 100 | | | | 1939 = 100 | Average = 100 | |
| | ooo acres | | | | | ooo acres | | | | | |
| | WHEAT | | | | | | RYE | | | | |
| Greece | 2,599 | 2,356 | 2,072 | 110.3 | 125.4 | 163 | 156 | 170 | 104.6 | 96.2 | |
| Hungary | (1) 4,313 | (2) 4,626 | (3) 3,926 | — | — | (1) 1,624 | (2) 1,718 | (3) 1,558 | — | — | |
| Luxembourg w) | 35 | 38 | 45 | 91.1 | 76.2 | 16 | 18 | 18 | 89.8 | 89.2 | |
| Romania | (4) 4,564 | 10,079 | 8,560 | — | — | (4) 426 | 1,107 | 1,037 | — | — | |
| Sweden | 764 | 828 | 716 | 92.2 | 106.6 | 426 | 463 | 539 | 92.0 | 78.9 | |
| Yugoslavia | * 4,695 | 5,585 | 5,392 | 84.1 | 87.1 | — | — | — | — | — | |
| U. S. S. R.: Lithuania . . | (5) 498 | (5) 512 | (6) 512 | 97.1 | — | (5) 1,428 | (5) 1,410 | (6) 1,255 | 101.3 | — | |
| Canada { w) | 775 | 735 | 590 | 105.5 | 131.4 | 786 | 891 | 565 | 88.2 | 139.2 | |
| United States { w) | 27,951 | 26,021 | 24,451 | 107.4 | 114.3 | 249 | 211 | 168 | 118.0 | 147.9 | |
| United States { s) | 34,922 | 37,802 | 40,498 | 92.4 | 86.2 | 3,086 | 3,811 | 3,363 | 81.0 | 91.8 | |
| United States { s) | 17,758 | 15,894 | 15,058 | 111.7 | 117.9 | | | | | | |
| India | 33,666 | 34,941 | 34,585 | 96.4 | 97.3 | — | — | — | — | — | |
| Egypt | 1,563 | 1,501 | 1,452 | 104.1 | 107.6 | — | — | — | — | — | |
| Argentina (7) | 17,273 | 17,833 | 18,473 | 96.9 | 92.3 | 2,718 | 2,296 | 2,105 | 118.4 | 129.1 | |
| | BARLEY | | | | | | OATS | | | | |
| Greece | 554 | 532 | 511 | 104.2 | 108.6 | 434 | 373 | 339 | 116.3 | 128.0 | |
| Hungary | (1) 1,300 | (2) 1,321 | (3) 1,135 | — | — | (1) 793 | (2) 633 | (3) 542 | — | — | |
| Romania | (4) 1,604 | 2,708 | 3,857 | — | — | (4) 1,406 | 1,455 | 1,910 | — | — | |
| Sweden | 264 | 280 | 258 | 94.6 | 102.3 | 1,574 | 1,647 | 1,647 | 95.6 | 95.6 | |
| U. S. S. R.: Lithuania . . | (5) 558 | (5) 550 | (6) 521 | 101.6 | — | (5) 944 | (5) 941 | (6) 858 | 100.4 | — | |
| Canada | 4,342 | 4,347 | 4,144 | 99.9 | 104.8 | 12,298 | 12,790 | 13,435 | 96.2 | 91.5 | |
| United States | 13,290 | 12,546 | 9,555 | 105.9 | 139.1 | 34,585 | 33,574 | 34,715 | 103.0 | 99.6 | |
| Egypt | 278 | 273 | 280 | 101.9 | 99.2 | — | — | — | — | — | |
| Argentina (7) | 2,125 | 2,122 | 1,975 | 100.2 | 107.5 | 3,768 | 3,446 | 3,251 | 106.8 | 115.9 | |

w) Winter crops. — s) Spring crops. — * Unofficial approximate estimate. — (1) Including the reannexed northern zone and Sub-Carpathia. — (2) Including the reannexed northern zone but excluding Sub-Carpathia. — (3) Territory as at the end of 1937. — (4) Not including Bessarabia and Northern Bucovina. — (5) Present territory. — (6) Former territory. — (7) Areas sown for the 1940-41 crop.

Greece: In the month of September the weather was generally fair and warm. Some rain fell during the first half and towards the end of the month.

Hungary: During the three weeks from September 11 to October 1, the weather was cool, cloudy and rainy the first week, dry and warm the second, and again cool and rainy the third. In most parts of the country rains were above average.

Wheat threshing is nearly over. In many places the quality of the wheat is mediocre. There are many wet grains which have germinated. The threshing of the other cereals has also been completed. Owing to excessive rains the quality of oats and winter barley is not too good.

The specific weight of the cereals of the 1940 harvest is as follows:

| | |
|-------------------------|----------------------|
| Wheat | 58-63 lbs per bushel |
| Rye | 50-59 " |
| Spring barley | 47-58 " |
| Oats | 31-41 " |

At the beginning of October the autumn field works and the sowing of cereals were going on in earnest, but they were greatly retarded both on account of the wetness of the soil and the lack of draft animals. At that time the sowing of barley and winter rye was still going on. Winter cereals sown early budded regularly.

Romania: In the second half of September the weather as been generally warm and dry. In Muntenia and Dobruja rains have been so scarce as to amount to real drought. Generally dry weather continued during the first decade in October, particularly in the Danube valley. The weather was favourable to threshing and to the ripening of weeded cultures, but it hindered the works in the fields and the sowing of winter cereals. The delay in the works due to the drought and the late ripening of the weeded cultures caused serious preoccupations among the officials of Romanian agriculture. The Ministry of Agriculture has prepared a detailed plan of the autumn cultural work, and given orders that all available tractors in possession of the Chambers of Agriculture and State institutions (Farms, Stations, Schools etc.) be put to work day and night. The necessary quantity of good quality wheat has been distributed among the farmers who did not have the seeds needed for seeding. At October 7, noticeable results had already been obtained in regard to the amount of land under work. At that date work had already been done over 27 per cent. above the amount of surface laboured last year at the same date. The progress of the sowing was not equally good, owing to the drought.

Sweden: As during the month of August, the temperature in September was below normal; it rained heavily: 50 per cent. above normal. The harvest of cereals was effected under unfavourable conditions, and damage was caused by the germination of the grains in sheaves on the fields. The wheat crop is remarkably below the average. (See Table of cereals).

According to the most recent estimate the production of meslin this year is about 12,127,700 centals (20,910,000 bushels) against 13,144,100 (22,662,500) in 1938 and 12,562,800 (21,660,200) on the average of the five years ending 1938; percentages 92.3 and 96.5.

Yugoslavia: Warm weather prevailed all over the country during the whole month of September and especially towards the end. During the first two weeks frequent rains, accompanied by a slight lowering of the temperature, fell nearly everywhere, particularly in the northwestern regions. Clear fine weather on the contrary prevailed during the second half of the month with the exception of a few rainy days at the beginning and at the end. These weather conditions were generally favourable to the work in the fields and to sowings of winter cereals. The poor cereal crop obtained this year obliged the Government to take a number of urgent measures in order to insure the provisioning of the country. Among such measures the following must be mentioned: (1) the intention to import a large quantity of wheat; (2) the prohibition to export barley; (3) the prohibition to export wheat and maize of the banovine of the Drina; (4) the mixing of maize flour in the preparation of wheat bread.

U. S. S. R.: By October 5 the harvest of cereals had been completed over 211,305,000 acres, i. e. 99.9 per cent. of the figure set by the plan, as against 207,930,000 acres at

Cereal Production.

| COUNTRIES AND PRODUCTS | 1940 | | | 1939 | | | Average 1934 to 1938 | | | 1940 | | | 1939 | | | Average 1934 to 1938 | | | % 1940 | |
|----------------------------|------------------|---------|-----|------------------|---------|--------|----------------------------|--|-----|------------------|-----------|---------|------------------|---------|-----|----------------------------|--|--|--------|---------|
| | | | | | | | | | | | | | | | | | | | 1939 | Average |
| | Thousand centals | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | = 100 | = 100 |
| WHEAT | | | | | | | | | | | | | | | | | | | | |
| Spain | * | 72,753 | | | 63,447 | (1) | 93,264 | | | * | 121,252 | | | 105,742 | (1) | 155,437 | | | 114.7 | 78.0 |
| Greece | | 20,503 | | | 22,975 | | 16,616 | | | | 34,171 | | | 38,291 | | 27,693 | | | 89.2 | 123.4 |
| Hungary | (2) | 45,748 | (3) | 67,862 | (4) | 48,933 | | | (2) | 71,246 | (3) | 113,102 | (4) | 81,554 | | | | | — | — |
| Italy | | 160,938 | | | 175,929 | | 160,487 | | | | 268,225 | | | 293,210 | | 267,474 | | | 91.5 | 100.3 |
| Romania | (5) | 36,402 | | | 98,169 | | 74,044 | | | (5) | 60,669 | | | 163,611 | | 123,404 | | | — | — |
| Slovakia | | 7,527 | | | 8,400 | | — | | | | 12,546 | | | 13,999 | | — | | | 89.6 | — |
| Sweden | | 10,020 | | | 18,831 | | 15,475 | | | | 16,700 | | | 31,384 | | 25,791 | | | 53.2 | 64.8 |
| Yugoslavia | * | 43,652 | | | 63,397 | | 53,571 | | | * | 72,751 | | | 105,659 | | 89,283 | | | 68.9 | 81.5 |
| U.S.S.R.:Estonia | | 1,676 | | | 1,880 | | 1,648 | | | | 2,792 | | | 3,133 | | 2,746 | | | 89.1 | 101.7 |
| Canada | (w) | 13,728 | | | 13,363 | | 8,437 | | | | 22,880 | | | 22,271 | | 14,061 | | | 102.7 | 162.7 |
| | (s) | 322,934 | | | 280,411 | | 149,630 | | | | 538,224 | | | 467,352 | | 249,383 | | | 115.2 | 215.8 |
| United States | (w) | 333,503 | | | 338,059 | | 335,654 | | | | 555,839 | | | 563,431 | | 559,423 | | | 98.7 | 99.4 |
| Mexico | (s) | 141,896 | | | 114,924 | | 94,772 | | | | 236,492 | | | 191,540 | | 157,954 | | | 123.5 | 149.7 |
| | | 7,740 | | | 8,863 | | 6,932 | | | | 12,900 | | | 14,771 | | 11,553 | | | 87.3 | 111.7 |
| India (6) | | 239,098 | | | 220,013 | | 219,475 | | | | 398,496 | | | 366,688 | | 365,792 | | | 108.7 | 108.9 |
| Turkey | | 102,118 | | | 101,587 | | 75,101 | | | | 170,194 | | | 169,309 | | 125,165 | | | 100.5 | 136.0 |
| Egypt | | 29,885 | | | 29,406 | | 26,102 | | | | 49,807 | | | 49,009 | | 43,502 | | | 101.6 | 114.5 |
| RYE | | | | | | | | | | | | | | | | | | | | |
| Spain | * | 15,432 | | | 9,045 | (1) | 10,981 | | | * | 27,558 | | | 16,152 | (1) | 19,608 | | | 170.6 | 140.5 |
| Greece | | 1,275 | | | 1,376 | | 1,248 | | | | 2,278 | | | 2,457 | | 2,229 | | | 92.7 | 102.2 |
| Hungary | (2) | 16,169 | (3) | 19,042 | (4) | 15,361 | | | (2) | 28,873 | (3) | 34,004 | (4) | 27,430 | | | | | — | — |
| Romania | (5) | 3,803 | | | 9,513 | | 8,625 | | | (5) | 6,791 | | | 16,987 | | 15,401 | | | — | — |
| Slovakia | | 4,991 | | | 4,894 | | — | | | | 8,912 | | | 8,740 | | — | | | 102.0 | — |
| Sweden | | 6,528 | | | 8,340 | | 9,327 | | | | 11,657 | | | 14,894 | | 16,655 | | | 78.3 | 70.0 |
| U.S.S.R.:Estonia | | 4,211 | | | 5,019 | | 4,216 | | | | 7,519 | | | 8,963 | | 7,528 | | | 83.9 | 99.9 |
| Canada | (w) | 5,998 | | | 6,820 | | 3,065 | | | | 10,710 | | | 12,178 | | 5,473 | | | 87.9 | 195.7 |
| | (s) | 2,174 | | | 1,752 | | 894 | | | | 3,883 | | | 3,129 | | 1,597 | | | 124.1 | 243.1 |
| United States | | 20,973 | | | 21,979 | | 23,115 | | | | 37,452 | | | 39,249 | | 41,276 | | | 95.4 | 90.7 |
| Turkey | | 11,314 | | | 9,396 | | 7,579 | | | | 20,314 | | | 16,779 | | 13,534 | | | 121.1 | 150.1 |
| BARLEY | | | | | | | | | | | | | | | | | | | | |
| Spain | * | 44,093 | | | 31,048 | (1) | 48,808 | | | * | 91,861 | | | 64,685 | (1) | 101,684 | | | 142.0 | 90.3 |
| Greece | | 5,280 | | | 4,877 | | 4,336 | | | | 11,001 | | | 10,160 | | 9,034 | | | 108.3 | 121.8 |
| Hungary | (2) | 15,305 | (3) | 17,407 | (4) | 13,402 | | | (2) | 31,885 | (3) | 36,265 | (4) | 27,922 | | | | | — | — |
| Romania | (5) | 14,674 | | | 17,999 | | 22,736 | | | (5) | 30,572 | | | 37,498 | | 47,367 | | | — | — |
| Slovakia | | 6,028 | | | 5,864 | | — | | | | 12,559 | | | 12,218 | | — | | | 102.8 | — |
| Sweden | | 4,246 | | | 5,517 | | 4,895 | | | | 8,846 | | | 11,494 | | 10,198 | | | 77.0 | 86.7 |
| U.S.S.R.:Estonia | | 1,830 | | | 1,985 | | 2,077 | | | | 3,812 | | | 4,136 | | 4,328 | | | 92.2 | 88.1 |
| Canada | | 53,058 | | | 49,511 | | 38,880 | | | | 110,538 | | | 103,147 | | 81,001 | | | 107.2 | 136.5 |
| United States | | 147,850 | | | 132,623 | | 98,233 | | | | 308,021 | | | 276,298 | | 204,652 | | | 111.5 | 150.5 |
| Turkey | | 58,423 | | | 50,601 | | 43,218 | | | | 121,716 | | | 105,420 | | 90,040 | | | 115.5 | 135.2 |
| Egypt | | 5,315 | | | 5,251 | | 4,951 | | | | 11,073 | | | 10,939 | | 10,316 | | | 101.2 | 107.3 |
| OATS | | | | | | | | | | | | | | | | | | | | |
| Greece | | 3,840 | | | 3,343 | | 2,479 | | | | 12,001 | | | 10,447 | | 7,748 | | | 114.9 | 154.9 |
| Hungary | (2) | 9,495 | (3) | 8,067 | (4) | 5,944 | | | (2) | 29,673 | (3) | 25,209 | (4) | 18,574 | | | | | — | — |
| Romania | (5) | 10,032 | | | 10,736 | | 13,140 | | | (5) | 31,349 | | | 33,548 | | 41,061 | | | — | — |
| Slovakia | | 4,192 | | | 3,439 | | — | | | | 13,100 | | | 10,747 | | — | | | 121.9 | — |
| Sweden | | 24,998 | | | 28,328 | | 27,854 | | | | 78,119 | | | 88,526 | | 87,042 | | | 88.2 | 89.7 |
| U.S.S.R.:Estonia | | 3,263 | | | 3,295 | | 3,190 | | | | 10,196 | | | 10,296 | | 9,968 | | | 99.0 | 102.3 |
| Canada | | 137,732 | | | 130,698 | | 110,641 | | | | 430,413 | | | 408,432 | | 345,752 | | | 105.4 | 124.5 |
| United States | | 389,847 | | | 299,909 | | 304,176 | | | | 1,218,273 | | | 937,215 | | 950,551 | | | 130.0 | 128.2 |
| Turkey | | 7,848 | | | 6,512 | | 4,842 | | | | 24,526 | | | 20,351 | | 15,132 | | | 120.5 | 162.1 |

(w) Winter crop. — (s) Spring crop. — * Unofficial estimate.

(1) Average 1934 to 1936. — (2) Including the reannexed northern zone and Sub-Carpathia. — (3) Including the reannexed northern zone but excluding Sub-Carpathia. — (4) Territory as at the end of 1937. — (5) Not including Bessarabia and North Bucovina. — (6) Second estimate.

the same date last year. The cereals gathered over 88 per cent. of the harvested acreage have been threshed.

The sowings of winter cereals are taking place more rapidly than last year: 80,693,000 acres had been sown by September 30 (88 per cent. of the surface set by the plan), as against 75,882,000 acres, i. e., 84 per cent. of the plan at the same date last year. Winter cereals have come up well nearly everywhere in the Union. Mild weather and sufficient humidity are helping the normal development of the crops.

At the beginning of the third decade in September rye and wheat were already out in the greatest part of Siberia and in the northern and central regions of the European territory, as well as in Ukraine. In Crimea and northern Caucasus seeds were out. In the Stalingrad region the crop appeared good. Seeds this year were developing better than last year and their condition was generally good. During the second decade in September three fourths of the seeds were well out, while last year at the same date, only a little over one fourth had sprouted.

Argentina: According to the latest report by the Ministry of Agriculture of Buenos Aires issued Oct. 1, weather conditions in September were favourable to the development of the wheat crop, which, at that time, was considered good.

United States: Rain in West, South, and East resulted in generally satisfactory soil conditions except parts of South-East, during the last week of September, and winter wheat conditions were varied. During the first week of October, general rain was reported in Middle-West and North-West. Seeding, germination, and growth of winter wheat benefited from favourable conditions everywhere, except in the South-East. The second week was featured by continued drought in the South-eastern areas and generally favourable conditions westward of the Rocky Mountains. In the interior valleys and part of Great Plains moisture was needed. Fall operations in the fields progressed well except in the dry sections. Rain would benefit winter wheat generally. During the week ended October 22, the first killing frost was reported in the Upper Ohio Valley and Middle Atlantic areas. Unusually favourable conditions continued west of the Rockies, except some moisture deficiency in California. General rain was needed in the South-East. Winter wheat was mostly seeded and early stand was satisfactory, but rain was generally needed.

The October crop report showed a further increase in the estimate of spring wheat production, which is now put at 236,403,000 bushels (141, 806, 000 centals).

MAIZE PRODUCTION IN THE NORTHERN HEMISPHERE.

The amount of maize produced in the United States characterizes nearly by itself the total production of the entire Northern Hemisphere, owing to the preeminent part that this country plays in the world production of maize. This year crop in the United States amounting to 2,352 million bushels, is considerably lower than that of the three preceding years: 2,619 million bushels in 1939, 2,562 million bushels in 1938 and 2,651 million bushels in 1937. The chief cause for this decrease in the production in 1940, as compared with the preceding years, must be attributed to a considerable decrease of areas sown to maize. It must be mentioned that a steady decrease in the maize area has been effected in the United States since 1934. In 1940 it has reached the lowest level in forty five years.

As the production in the United States this year is nearly 267 million bushels, *i. e.*, 10.2 per cent. less than in 1939, it follows that the total production of the Northern hemisphere is also remarkably lower. In the United States weather conditions were generally favourable to the maize crop, so that a further decrease in the production was avoided. The unit yield, which in October was estimated at 15.3 centals per acre (27.3 bushels per acre) was surpassed, in the last twenty years, only three times, in 1937, 1938 and 1939.

The crop of the second maize center of production in the Northern hemisphere, *i. e.*, the group of the four Danubian countries (Romania, Yugoslavia, Hungary and Bulgaria), is particularly important this year; because, owing to the war, the exportation of the large stocks existing in Argentina is very difficult. In all these four countries, it was expected in the spring that the areas sown to maize would be increased, following the decrease of areas sown to autumn cereals; and in Hungary in particular an increase of areas was expected on account of the growing development of the pigs fattening industry, for which maize is the first material.

But, owing to the territorial changes which have taken place in that part of Europe, statistical data are not at present sufficiently comparable to show the extent of this increase. For Romania before the territorial changes, there is available the first official estimate of area sown to maize, dated June 1940, which shows that the increase was 5.2 per cent. as compared with 1939.

*Production of maize in some important producing countries
of the Northern Hemisphere.*

(million bushels of 56 lb.)

| COUNTRIES | 1940 | 1939 | Average 1934-1938 | % of 1940 | |
|-------------------------|---------|---------|----------------------|---------------|------------------|
| | | | | 1939 = 100 | Average = 100 |
| United States | 2,352 | 2,619 | 2,097 | 89.8 | 112.2 |
| Romania (1) | 158 | (2) 203 | (3) 163 | 77.7 | 96.6 |
| Yugoslavia | (2) 197 | 159 | 185 | 123.6 | 106.6 |
| Hungary | (4) 111 | (5) 92 | 91 | — | — |
| Bulgaria | ... | 35 | 32 | ... | ... |
| Turkey | 29 | 28 | 22 | 101.9 | 130.4 |

(1) Without Bessarabia and Northern Bukovina. — (2) Approximate unofficial data. — (3) Including the reincorporated northern zone and Sub-Carpathia without northern Transylvania. — (4) Including the reincorporated northern zone without Sub-Carpathia and northern Transylvania. — (5) Hungarian territory at the end of 1937.

Cold and rainy weather in the Spring delayed considerably the work on the soil and the sowing of maize in Romania. Weather conditions during the first phase of vegetation were by no means favourable. The lack of labour hands seriously hindered cultural works. Dampness however aided the vigorous growth of the plants, and warm weather during the second half of September and the

first half of October, insured complete ripening of the maize crop in the greatest part of the regions. The forecast for the maize production in Romania, is, therefore, much better than it was expected. It is hoped that, in spite of the low wheat crop, the maize production will be sufficiently high as to not only cover consumption needs, but even allow some exports.

In Yugoslavia weather conditions were nearly the same as in Romania. The maize crop appears very good, while the production of wheat has been low. It is expected that the high maize production will allow the export of a considerable surplus amount, and that during the 1940/41 season, Yugoslavia will be the most important among the exporting Danubian countries.

A very good maize production is registered in Hungary; but, owing to the impossibility of comparing this year statistical data on the maize production with those of the preceding years, and also owing to the incorporation of new territories, no estimate can yet be made on the surpluses that may be available for exportation. It must be mentioned that both in Sub-Carpathia and Northern Transylvania the production of maize is not sufficient for home consumption. Indeed, important quantities of maize from other Hungarian provinces will have to be sent to Sub-Carpathia and Northern Transylvania, thus diminishing the quantity available for exportation.

Bulgaria has stopped the publication of statistical information on its agricultural production. However, on the basis on available information on weather conditions and on the state of cultural works, a maize production above the average can be forecast.

From this various information the conclusion may be drawn that the whole of the maize production of the Danubian countries taken all together, is about 2 per cent. higher than that of 1939 and about 4 per cent. above the 1934-1938 average.

It must be remarked that the incorporation of Bessarabia and Northern Bukovina by the U. S. S. R. is of the utmost importance in regard to the maize production and export possibilities of the four Danubian countries taken as a whole. In fact Bessarabia was one of the Romanian provinces which generally registered a surplus in the production of maize. At the present moment it is impossible to say whether the Bessarabian maize surplus will continue to be exported, or will be distributed within the U. S. S. R. This last possibility cannot be put aside altogether, especially in view of the fact that during the recent years the U. S. S. R. has considerably reduced the culture of maize. But even without Bessarabia and Northern Bukovina, where the average maize production in the years 1934-38 was of about 39 millions bushels, the group of the four Danubian countries will remain one of the most important maize exporting centers. During the 1940-41 season in particular, the Danubian group will undoubtedly appear as a large exporter of maize, with Yugoslavia by far the most important among the four countries. The actual export amount will necessarily depend mostly on the general political situation.

Besides the information regarding the United States and the four Danubian countries, there is available the first estimate of the 1940 maize production in Turkey, which is put at 29 million bushels. This is the largest pro-

duction registered in Turkey in the last 15 years. During the last three years Turkey's maize exports were very modest. Taking into account the fact that the Turkish maize production in 1939 was also quite high, it can be expected that a certain amount will be available for export. At this time, however, the exportation of maize from Turkey is forbidden.

Among the countries that are producers as well as importers of maize, Italy registered this year a very good crop and Portugal a crop above the average.

V. DESMIREANU.

CURRENT INFORMATION ON MAIZE.

Bulgaria: The weather, which at the beginning of September was rainy and cool, turned to warmer and sunshiny during the last two decades of the month. These weather conditions were favourable to the ripening of the maize. At the end of the month the state of the crop was good. The forecast is for a maize production above the average of these last years.

Greece: Except for some rain at the beginning and at the end of the month, the weather in September was generally favourable to the ripening of the grains of maize.

Hungary: At the beginning of October the harvest of early maize had begun in many places. At that time however there were places where the harvest was being done and others where the early maize was still green and needed several hot days for ripening.

Late varieties needed from two to three weeks of hot weather for ripening in the greatest part of the country. The forecast is for a very abundant yield.

Portugal: The forecast for the maize crop is good enough. Good yields are registered in the most important zones of production, Beja, Evora, Castelo Branco.

Romania: Warm weather during the second half of September was very favourable to the maize crop. By the last week of September the harvest of early varieties had begun. Towards the middle of October late varieties were generally ripe, except in the mountainous regions. In case a certain proportion of the crop does not ripen completely, the Ministry of agriculture has taken the necessary measures for artificial drying.

Yugoslavia: The generally rainy and rather warm weather in the first two weeks of September was favourable to the growth of maize. Some apprehension has been entertained regarding the ripening of the grains, especially in view of the fact that in some localities the plants were still green and needed more sunshine. Clear, sunny and warmer weather during the second half of the month helped ripening of the grains. Towards the end of the month early maize was harvested in several regions, and the harvesting of late maize had also been started. The new crop contains from 20 to 25 per cent. of humidity, which is considered normal.

In spite of the good condition of the crop nearly everywhere, up to the beginning of October the forecasts on this year production were quite varied. While most of the information indicates that the crop will be very abundant (above 110 million centals

197 million bushels), in some quarters it is believed that the maize crop, even though it is abundant, cannot be much above 88 million centals (157 million bushels).

This year trend of the agricultural campaign however justifies the belief that the estimate for an abundant crop is correct.

Argentina: According to the third official estimate, maize production in 1939-40 amounts to 226,945,000 centals (405,259,000 bushels). This new figure shows a decrease of 7,700,000 centals (13,800,000 bushels) on the June estimate, but still represents an exceptionally large crop inferior only to the record productions of 1930-31 and 1934-35. The new estimate is respectively 111.6 per cent. and 25.2 per cent. larger than the final estimates for 1938-39, 107,233,000 centals (191,488,000 bushels) and the preceding five-year average, 181,315,000 centals (323,777,000 bushels). This year's crop is obtained from a sown area of 17,800,000 acres, which is the largest yet sown, with the exception of the record of 1935-36 exceeding the 1938-39 area by 35.8 per cent. and the previous five-year average by 7.6 per cent. The size of this year's crop is due also to the very favourable season, which was marked by heavy and well distributed rains in the principal maize regions and by sunny weather during maturation.

United States: At the end of September a killing frost was reported in the corn belt, but crop was largely matured and beyond damage. During the first week of October corn matured in the principal producing areas but it was generally too moist for cribbing. At the end of the third week, corn was drying rapidly, but cribbing was not yet extensive.

The October crop report showed a further increase of 30,800,000 centals (55,000,000 bushels) in the estimate of maize production, which is now put at 1,317,224,000 centals (2,352,185,000 bushels), as against 1,466,717,000 centals (2,619,137,000 bushels) in 1939 and 1,174,369,000 centals (2,097,088,000 bushels) the five-year average 1934-38; percentages: 89.8 and 112.2.

CURRENT INFORMATION ON RICE.

Portugal: A good rice crop is forecast, especially in the most important zones of production, Santarem, Coimbra and Setubal.

Romania: About the tenth of October the rice crop appeared very good both as to quantity and quality. It must be remarked that the rice culture in Romania is of very recent date and that, after the territorial cessions, the rice fields have been left to Romania.

Argentina: The production of rice in 1939-40 is estimated at 2,138,000 centals (4,752,000 bushels) against 2,291,000 centals (5,092,000 bushels) in 1938-39 and an average of 746,000 centals (1,658,000 bushels) in 1933-34 to 1937-38; percentages, 93.3 and 286.6.

United States: According to the October Crop Report, the production of rice in 1940 is estimated at 23,129,000 centals (51,397,000 bushels) against 23,538,000 (52,306,000) in 1939 and an average of 21,078,000 (46,839,000) in 1934 to 1938; percentages, 98.3 and 109.7.

POTATOES.

Owing to the war, many countries have stopped their information service. It is impossible therefore to give a numerical estimate of the volume of world production. Particularly this is the case of the potato crop, which is essentially a European production. In fact Europe (Soviet Union excluded) contributes nearly 90 per cent. of the world production. It is the more difficult to give an estimate of the potato crops in Europe as all the great producing countries are involved in the war. By order of importance, these countries are: Germany, old Poland, France, old Czechoslovakia, which contributed 80 per cent. of the European production. While numerical indications on the volume of the production are lacking, it is possible to get an approximate idea on the probable results of this year's campaign, from some general information gathered from various sources. In Germany, which is by far the most important producing country, the crop appears to be very abundant, thanks to very favourable weather conditions, especially during the summer months. No direct information is available regarding France, where the season was generally favourable to the potato crop. But war operations have undoubtedly reduced its volume.

In the other less important producing countries of Europe, the production seems to be at least satisfactory. In the Netherlands the potato crop appears to be as good as the sugar beet crop. Hungary registers a very good production with high yields. Production in Italy is estimated to be 10 per cent. higher than last year. In Romania the acreage sown to potatoes has been considerably increased.

Good yields are forecast in Sweden and Norway. In Denmark the situation improved at the beginning of September, but the production appeared somewhat lower than average. In the Baltic countries, in Lithuania and Estonia, where the surface sown to potatoes is very great, the forecast is for a good yield. Very satisfactory results are expected in Switzerland.

Among the extra-European producing countries, only Canada and the United States are of a certain importance in the production of potatoes. Still Europe leads with a potato production of a far greater volume. In Canada the acreage sown to potatoes was somewhat increased, and a satisfactory crop is forecast. In the United States the production is very good; 7 per cent. higher than last year and 3 per cent. above the average.

Although it is impossible to base our forecasts on the production of the great producing countries, it is not too much to say that, contrary what happens in the case of cereals in Europe, the 1940 potato crop can be considered very satisfactory.

CURRENT INFORMATION ON POTATOES.

Germany: According to information given out by the Ministry of Food and Agriculture, the 1940 potato crop will be about 1,323 million centals (2,205 million bushels), of which 1,213 million centals (2,021 million bushels) represent the production

of the territory of old Germany. Thus the crop in the old territory will be nearly as abundant as the top one of 1937, which was about 1,219 million centals (2,032 million bushels), and above the large crop of 1939 which was 1,138 million centals (1,896 million bushels). The average for the years 1934-38 was 1,063 million centals (1,771 million bushels).

Bulgaria: Thanks especially to rains in the first two weeks of the month, weather conditions in September were generally favourable to the growth of the potato crop.

Fairer and warm weather in the second half of the month was favourable to harvest works.

Denmark: According to the most recent estimate area cultivated to potatoes was 171,740 acres against 195,900 in 1938 and 190,200 on the average of the five years ending 1937; percentages 87.7 and 90.3. The corresponding production is estimated at 26,980,300 centals (44,966,200 short tons) against 31,585,700 (52,641,800) and 28,793,400 (47,088,000); percentages 85.4 and 93.7.

Hungary: The crop of the early varieties of potatoes was of good quality and abundant. At the beginning of October early varieties were still being harvested here and there. By then the pulling out of late varieties had also been started. Tubers are generally large, healthy and numerous. The potato crop is considered very abundant.

According to the most recent estimate, the potato crop in Hungary, including the reincorporated northern zone and sub-Carpathia except northern Transylvania, amounts to 73,884,000 centals (123,137,000 bushels). In 1939 the production in the territory including only the reincorporated northern zone, was 50,553,000 centals (84,253,000 bushels). The average for the five years 1934-38 in the territory of Hungary at the end of 1937, was 47,014,000 centals (78,356,000 bushels).

The unit yield this year is 86.2 centals (143.6 bushels) per acre. In 1939 it was 66.0 centals per acre (110.0 bushels). The average for 1934-38 was 65.4 centals per acre (109.0 bushels).

Romania: At the tenth of October the potato crop appeared good.

Sweden: According to the most recent estimate area cultivated to potatoes this year is about 333,600 acres against 336,300 in 1939 and 329,100 on the average of the five years ending 1938; percentages 99.2 and 101.4. The corresponding production is estimated at about 49,377,100 centals (82,293,500 bushels) against 41,180,500 (68,647,800) and 41,011,000 (68,350,300); percentages 119.9 and 120.4.

U. S. S. R.: By the 25th September potatoes had been pulled out over about 1/5 of the cultivated area. In White Russia and other regions where the potato crop is of great importance, unit yields were remarkably high.

Argentina: During the month of September the preparatory work of the soil for the new planting of potatoes was actively continued.

United States: According to the October Crop Report, the production of potatoes in 1940 is estimated at 233,455,000 centals (389,091,000 bushels) against 218,410,000 (364,016,000) in 1939 and an average of 227,263,000 (378,772,000) in 1934 to 1938; percentages, 106.9 and 102.7.

THE PRODUCTION OF BEET SUGAR IN 1940-41.

During the last period of vegetation the weather was generally favourable to the sugar beet crop. In the northern countries of Europe where sugar beets had suffered from the drought, September rains brought some relief, but not such as to cause a marked improvement in the vegetation and to make up for the retard in the growth of the plants. In the central European countries weather conditions were normal and favourable to the last phase of the vegetation. In some cases excessive rains caused a loss in the sugar contents of the beets, but in most cases the sugar contents are far above the average. Damages caused by pests are few. The pulling up of the sugar beets had already been started in the first days of October, and in many regions it was already over.

1940-41 Season. — Analysis of Sugar-Beets.

| COUNTRIES | Average weight of root | | | Average weight of leaves | | | Sugar content | | | Weight of sugar per root | | |
|-----------------------|------------------------|------|-----------|--------------------------|----------|-----------|---------------|------|-----------|--------------------------|------|-----------|
| | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 |
| | oz. | oz. | oz. | oz. | oz. | oz. | % | % | % | oz. | oz. | oz. |
| 1st WEEK OF SEPTEMBER | | | | | | | | | | | | |
| Sweden | 14.1 | 15.9 | 15.8 | 14.5 | 15.1 | 14.6 | 16.3 | 16.7 | 16.3 | 2.3 | 2.7 | 2.6 |
| 2nd WEEK OF SEPTEMBER | | | | | | | | | | | | |
| Belgium | 20.5 | 20.4 | 18.1 | 26.5 | 32.1 | 22.0 | 15.9 | 13.5 | 15.4 | 3.2 | 2.8 | 2.8 |
| Sweden | 14.7 | 16.6 | 16.8 | 14.5 | 14.3 | 14.1 | 17.2 | 17.6 | 16.7 | 2.5 | 2.9 | 2.8 |
| 3rd WEEK OF SEPTEMBER | | | | | | | | | | | | |
| Denmark | 17.6 | 20.7 | 16.2 | 16.4 | 17.8 | 14.4 | 17.3 | 15.7 | 15.5 | 3.0 | 2.9 | 2.5 |
| 4th WEEK OF SEPTEMBER | | | | | | | | | | | | |
| Denmark | 18.6 | 21.7 | 17.0 | 16.9 | 17.4 | 14.2 | 17.1 | 16.1 | 15.8 | 3.2 | 3.5 | 2.7 |
| Finland | 13.7 | 17.6 | (*) 17.3 | 22.3 | 13.8 | (*) 18.3 | — | — | (*) 14.1 | — | — | (*) 2.1 |
| 1st WEEK OF OCTOBER | | | | | | | | | | | | |
| Finland | 14.8 | — | (*) 18.5 | 22.4 | (*) 16.0 | — | — | — | — | — | — | — |

(*) Average of four years. — (†) Year 1935. — (‡) Year 1938.

In the southwestern European countries the first crops were ripe in the second half of July, and at the end of August the harvest had been done everywhere. Roots were very well developed and the yield by acre was very high. In the Balcan countries ripening was later than usual, but in those countries also the weight of the roots was very good as a result of a suitable distribution of rains

and warm sunny days. The amount of sugar contents is very satisfactory. The condition of the sugar beet crops, — which in Europe during the whole period of vegetation was favoured by rather good, though somewhat cold, weather, especially at the beginning, — improved gradually till, near harvest time, it became excellent. These favourable circumstances and the increase of surfaces sown to sugar beets give hope of a rather high production.

In fact the first replies received by the Institute following its survey on the probable production of sugar in the 1940-41 season, confirm, in most cases, the first favourable forecasts.

Only in Denmark, Finland, the United Kingdom and Sweden estimates on the production of beet sugar are lower than those of last year. For Italy, the table indicates the production figure established by a decree of the Ministry on

Production of Beet-Sugar (raw).

| COUNTRIES | TOTAL PRODUCTION DURING THE SEASON | | | % 1940-41 | |
|--------------------------------------|---------------------------------------|-----------|----------------------------------|-----------|---------|
| | 1940-41 (1) | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 | Average |
| | thousand centals | | | = 100 | = 100 |
| Germany | ... | 2) 50,791 | 45,865 | ... | ... |
| Bohemia-Moravia | ... | 10,278 | 14,323 | ... | ... |
| Slovakia | 1,279 | 1,184 | ... | ... | ... |
| Poland | ... | 2) 9,480 | 10,828 | ... | ... |
| Belgium | 5,953 | 5,831 | 5,175 | 102 | 115 |
| Bulgaria | 882 | 661 | 353 | 133 | 250 |
| Denmark | 5,291 | 5,556 | 4,221 | 95 | 125 |
| Spain | 2) 3,968 | 2) 1,813 | 4,478 | 219 | 89 |
| Finland | 176 | 188 | 251 | 94 | 70 |
| France | ... | 22,779 | 21,349 | ... | ... |
| Hungary | 3,748 | 2,875 | 2,728 | 130 | 137 |
| Ireland | 2,205 | 1,436 | 1,816 | 154 | 121 |
| Italy | 11,000 | 10,472 | 7,826 | 105 | 141 |
| Netherlands | 6,063 | 5,083 | 4,990 | 119 | 121 |
| Romania | ... | 3,736 | 2,561 | ... | ... |
| United Kingdom | 2) 11,464 | 12,103 | 11,300 | 95 | 101 |
| Sweden | 6,623 | 6,856 | 6,632 | 97 | 100 |
| Switzerland | 331 | 317 | 230 | 104 | 144 |
| Yugoslavia | 2,778 | 2,646 | 1,662 | 105 | 167 |
| <i>Total Europe (a)</i> | ... | 154,085 | 146,588 | ... | ... |
| U. S. S. R. | 3) 58,202 | 54,675 | 44,684 | — | — |
| Latvia | — | 882 | 1,070 | — | — |
| Lithuania | — | 530 | 503 | — | — |
| <i>Total Europe (b)</i> | ... | 210,172 | 192,845 | ... | ... |
| Canada | ... | 1,916 | 1,485 | ... | ... |
| United States | ... | 35,118 | 28,341 | ... | ... |
| <i>Total North America</i> | ... | 37,034 | 29,826 | ... | ... |
| Japan | ... | 689 | 982 | ... | ... |
| Turkey | 2,315 | 2,315 | 1,335 | 100 | 173 |
| <i>Total Asia</i> | ... | 3,004 | 2,317 | ... | ... |
| <i>GENERAL TOTALS</i> | (a) ... | 194,123 | 178,731 | ... | ... |
| | (b) ... | 250,210 | 224,988 | ... | ... |

(a) Not including U. S. S. R. — (b) Including U. S. S. R. — (1) Approximate data. — (2) Licht's estimate. — (3) Including the part of Poland incorporated in U. S. S. R., Latvia and Lithuania.

30th September 1940. While the production is higher than last year, it still remains considerably lower than that which had been forecast by the "Con-sorzio Nazionale Produttori Zucchero".

In the annexed table where estimates on sugar production are assembled, data relative to Germany, Bohemia-Moravia, France and Romania are missing. Data on the production in Germany and Bohemia-Moravia were not published; but, according to official statements, the sugar beet production this year was very high. As regard France it is now known that damages caused by war to fields and factories were quite serious in the zones of war operations. These zones are the most important among those cultivated to sugar beets in France; but detailed data on the subject are lacking and not even an approximate estimate of the production can be attempted. It can be stated however that the production will be considerably lower than in 1939-40, notwithstanding the increased acreage in 1940. The Romanian Ministry of Finances has informed the Institute that data relative to the Romanian production will be forwarded shortly.

Altogether, considering only the countries for which estimates are known, and which manufacture about the 2/3 of the European beetsugar, it can be said that their total sugar production,—including the Soviet Union,—is about 5 per cent. higher than that of the preceding season, and about 25 per cent. above the average production of the five preceding years.

In the United States a very high unit yield has more than compensated the decrease of the areas sown to sugar beets. The production of sugar from beets is estimated to be at least equal to that of last year and much higher than the average of the preceding five years.

In Turkey the forecast is for a production about equal to that of last year.

CURRENT INFORMATION ON SUGAR.

Denmark: According to the most recent estimate the area cultivated to sugar beet in 1939 was 97,900 acres against 93,850 in 1938 and 100,900 on the average of the five years ending 1937; percentages 104.3 and 97.0. The corresponding production is estimated at 36,387,400 centals (1,819,400 short tons) against 30,049,000 (1,502,400) and 35,188,000 (1,759,400); percentages 121.1 and 103.4.

Hungary: At the beginning of October the pulling out and the transportation of sugar beets had begun. Roots are well developed and leaves are still green and healthy. The crop is judged very abundant.

Netherlands: According to unofficial information, the pulling out of sugar beets had started in the first days of October. Crop forecasts are very favourable both as regards the quantity and the quality of the beets, because the sugar percentage is higher than last year when it amounted to 16.7 per cent.

Romania: At about October 10 the forecast was for a very good sugar beets production. A probable unit yield of about 161 centals per acre (8 short tons per acre) was forecast.

Slovakia: According to unofficial sources, the surface sown to sugar beets this year amounts to 47,000 acres, and is 30 per cent. greater than that of 1939. The sugar beets production during this year campaign is estimated at 9,259,000 centals (463,000 bushels).

Sweden: According to the most recent estimate the area cultivated to sugar beet this year is about 134,200 acres against 125,400 in 1939 and 127,800 on the average

Production of Cane-Sugar.

| COUNTRIES | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | % 1939-40 | |
|------------------------------|-------------|---------|--|-------------|------------|--|------------------|------------------|
| | | | | | | | 1938-39 = 100 | Average = 100 |
| | ooo centals | | | short tons | | | | |
| AMERICA. | | | | | | | | |
| Antigua. | 304 | 493 | 514 | 15,200 | 24,640 | 25,688 | 62 | 59 |
| Argentina | 11,442 | 10,244 | 8,147 | 572,000 | 512,190 | 407,341 | 112 | 140 |
| Barbados | 1,587 | 3,502 | 2,517 | 79,000 | 175,114 | 125,850 | 45 | 63 |
| Brazil. | 26,235 | 24,251 | 23,161 | 1,310,000 | 1,200,000 | 1,158,050 | 108 | 113 |
| Cuba | 62,567 | 61,730 | 57,752 | 3,128,000 | 3,100,000 | 2,887,585 | 101 | 108 |
| Ecuador | 507 | 483 | 413 | 25,000 | 24,100 | 20,657 | 105 | 123 |
| United States (La. & Fl.) | 10,582 | 11,660 | 7,196 | 530,000 | 583,000 | 359,800 | 91 | 147 |
| British Guiana | 3,505 | 4,239 | 3,978 | 175,000 | 211,954 | 198,899 | 83 | 88 |
| Surinam | 245 | 270 | 378 | 12,240 | 13,499 | 18,895 | 91 | 65 |
| Jamaica | 2,227 | 2,642 | 2,086 | 111,000 | 132,100 | 104,287 | 84 | 107 |
| Martinique. | 1,323 | 1,433 | 1,104 | 70,000 | 72,000 | 55,206 | 92 | 120 |
| Mexico | 6,834 | 7,772 | 6,037 | 340,000 | 388,602 | 301,854 | 88 | 113 |
| Peru | 8,686 | 8,157 | 8,702 | 434,000 | 410,000 | 435,102 | 106 | 100 |
| Puerto Rico | 20,393 | 17,042 | 18,515 | 1,020,000 | 852,000 | 925,750 | 120 | 110 |
| Dominican Republic | 9,921 | 9,502 | 9,030 | 500,000 | 475,000 | 451,494 | 104 | 110 |
| St. Kitts | 626 | 836 | 659 | 31,300 | 41,816 | 32,944 | 75 | 95 |
| St. Lucia | 220 | 180 | 168 | 11,000 | 9,016 | 8,424 | 122 | 130 |
| Trinidad | 2,866 | 2,877 | 2,983 | 140,000 | 143,870 | 149,129 | 100 | 96 |
| Venezuela | 551 | 540 | 489 | 28,000 | 27,000 | 24,472 | 102 | 113 |
| Total America | 170,621 | 167,853 | 153,829 | 8,531,740 | 8,395,901 | 7,691,410 | 102 | 111 |
| ASIA. | | | | | | | | |
| Taiwan | 26,630 | 33,671 | 19,895 | 1,331,500 | 1,683,500 | 994,719 | 79 | 134 |
| India | 72,532 | 56,879 | 59,190 | 3,630,000 | 2,840,600 | 2,959,455 | 128 | 123 |
| Japan | 3,386 | 3,596 | 2,359 | 169,300 | 179,800 | 117,951 | 94 | 144 |
| Java | 34,172 | 34,392 | 19,839 | 1,710,000 | 1,720,000 | 991,927 | 99 | 172 |
| Philippines | 24,912 | 22,708 | 23,455 | 1,230,000 | 1,140,000 | 1,172,739 | 110 | 106 |
| Total Asia | 161,632 | 151,246 | 124,738 | 8,090,800 | 7,563,300 | 6,236,791 | 107 | 130 |
| AFRICA. | | | | | | | | |
| Egypt. | 3,524 | 3,573 | 3,179 | 176,200 | 178,634 | 158,951 | 99 | 111 |
| Mauritius | 5,059 | 7,084 | 5,886 | 252,930 | 354,180 | 294,310 | 71 | 86 |
| Reunion | 1,622 | 1,890 | 1,745 | 81,100 | 94,505 | 87,267 | 86 | 93 |
| Union of South Africa | 11,623 | 11,616 | 9,426 | 581,100 | 580,800 | 471,290 | 100 | 123 |
| Total Africa | 21,828 | 24,163 | 20,236 | 1,091,330 | 1,208,119 | 1,011,808 | 90 | 108 |
| OCEANIA. | | | | | | | | |
| Australia | 20,724 | 18,437 | 15,933 | 1,040,000 | 921,900 | 796,647 | 112 | 130 |
| Hawaii | 19,268 | 19,401 | 18,961 | 963,000 | 970,000 | 948,051 | 99 | 102 |
| Fiji Islands | 2,205 | 2,654 | 2,912 | 100,000 | 132,700 | 145,602 | 83 | 76 |
| Total Oceania | 42,197 | 40,492 | 37,806 | 2,103,000 | 2,024,600 | 1,890,300 | 104 | 112 |
| TOTALS | 396,278 | 383,754 | 336,609 | 19,816,870 | 19,191,920 | 16,830,309 | 103 | 118 |

(1) Approximate data.

of the five years ending 1938; percentages 107.0 and 105.0. The corresponding production is estimated at about 43,717,800 centals (2,185,900 short tons) against 41,885,100 (2,094,200) and 41,616,000 (2,081,000); percentages 104.4 and 105.1.

Yugoslavia: Rainy, but rather warm weather during the first two weeks in September was favourable to the growth of sugar beets, especially as regards the volume and weight of leaves and roots. Clear and sunny days in the second half of the month were favourable both to the sugar contents, the pulling out of sugar beets and their transportation to factories. At the end of the month these operations were in full swing all over the zones of production.

In spite of the reduction of the surface sown to beets this year (a reduction caused by apprehensions regarding the price which the State was to fix for the buying of the production) and in spite of the damages caused by mildew in some places, an abundant production of sugar beets is forecast.

According to preliminary and unofficial information, the sugar beets crop may amount to 22 million centals (1.1 million short tons), *i. e.*, to nearly as high a production as the top one of 1929. However the quality of the new crop appears to be slightly inferior to that of last year, owing to late sowings and the lack of sufficient sunny days.

It is expected that this abundant crop will give a large enough production of sugar to entirely fill the needs of the country.

U. S. S. R.: The pulling out of sugar beets this year was started from 10 to 15 days later than usual. The first results of the harvest which had been completed over a very wide surface, show that, in the majority of the sugar beets producing regions, the yield by acres is considerably higher than last year.

Argentina: It is confirmed that the sugar beets production during the present season has been mediocre in the province of Buenos Aires. The importance of this production is diminishing in the other centers of production of the country.

United States: The production of sugar beets in 1940 is now estimated at 221,500,000 centals (11,076,000 short tons) against 215,460,000 (10,773,000) in 1939 and an average of 179,416,000 (8,971,000) in 1934 to 1938; percentages, 102.8 and 123.5.

CURRENT INFORMATION ON VINES.

Bulgaria: According to unofficial sources vintage this year appears to be much below that of last year when the production of raisins was considered normal. Thanks to warm and sunny in September, raisins appear good and healthy.

Hungary: Warm and sunny weather during the second half of September was favourable to the ripening of grapes. At the beginning of October the vintage of early varieties of raisins had begun. The forecast is for a weak production of must, both as to quality and quantity.

Portugal: Wine production is very poor. It is estimated at about one half the production of 1939, which was 7.7 million hectoliters.

Romania: Towards the 10th October the wine production appeared rather poor. Prices of old wines are increasing.

Switzerland: The production of wine in 1940 is not good. Only in the cantons of Valais and at Lavaux a good yield is forecast. Vines were damaged in the course of their development by adverse weather conditions in the fall of 1939. Serious damage was done by the excessive cold of the winter 1939-40, and then, in some regions, by bad weather and hail at the time of budding.

The production of wines in 1940 is estimated at 11,054,000 Imperial Gallons (13,275,000 American Gallons) against 17,432,000 (20,934,000) in 1939 and an average of 14,290,000 (17,160,000) in 1934 to 1938; percentages, 63.4 and 77.4.

Yugoslavia: Frequent rains accompanied by hail during the first half of September caused the spread of cryptogamic maladies in several wine regions of the country, particularly in the northwest, where the vineyards were rather seriously damaged. More dry and warm weather in the second half of the month considerably improved the conditions of the vines, especially in the southern and litoral regions, where the vintage appears more or less satisfactory. The raisins crop and the production of wine all over the country appear still rather poor. The production in the northern sections may not be even one half of that of last year.

U. S. S. R.: The surface left to vines in the U. S. S. R. this year is estimated at 889,600 acres. In many regions unit yields are greater than last year. It is estimated that the total production of raisins will amount to about 22,046,300 centals (2,204,600 bushels) more than last year.

CURRENT INFORMATION ON OLIVES.

Greece: Important surplus stocks from the preceding season have induced the Ministry of Economy to allow the exportation, during the month of September, of large quantities of olive oil to Italy, England and the United States, notwithstanding pessimistic reports on the probable yield of the next crop.

The production of olive oil in 1940 is estimated at 2,187,000 centals (29,160,000 American Gallons) against 3,422,700 (45,635,000) in 1939 and an average of 2,529,000 (33,722,600) in 1934 to 1938; percentages, 63.9 and 86.5; and the production of table olives in 1940 is estimated at 271,300 centals against 1,751,100 in 1939 and an average of 787,200 in 1934 to 1938; percentages, 15.5 and 34.5.

Portugal: The olive crop appears very irregular, and generally weak. In the important Santarém region the attacks of the olive fly have been particularly bad and damage to the crop has been heavy. A poor production is forecast also for the province of Alemtejo.

Yugoslavia: As was expected, the olive crop this year appears to be unsatisfactory, especially from the point of view of the quality, owing to attacks of "dacus".

PRELIMINARY RESULTS AND ESTIMATES ON THE WORLD LINSEED CROP IN 1940-41.

A survey on the situation of the world linseed production during the present campaign is more difficult than in ordinary times, particularly as regards crop estimates in Europe where, owing to the war, most of the linseed producing countries have stopped, a year since, the publication of all sorts of information dealing with their economic activities. So far only Belgium, Hungary, Lithuania and Romania have communicated their preliminary estimates on the area sown to linseed this year. Hungary is the only country in Europe which has published the data on the 1940 production.

Under these circumstances it is impossible to estimate even approximately this year's European production. One can only give a general idea on such production, gathering it from information on the amount of areas sown to linseed and on the weather conditions which have accompanied the crop during its various phases of growth, taking into account the information on the crop conditions furnished by the Governments. It must not be forgotten, however, that Europe does not play an important part in the world production of linseed. The 1939 production on this continent over a record surface amounting hardly to 9 per cent. of the world total (the USSR not included), was only 5,291,000 centals (9,448,000 bushels), i. e., not over 10 per cent. of the total. In general weather conditions this year were not any too favourable to the growth of linseed in Europe: spring was very cold and the beginning of summer was misty, stormy and wet, with temperatures which, on the whole of the continent, were too low for a healthy growth of the plants. In some regions, and particularly in the central and south-eastern parts of the continent, floods damaged the crops, which were also unfavourably affected by the lack of sufficient care owing to military mobilisations. Furthermore, war operations contributed to reduce unit yields in many of the large producing countries, such as France, the Netherlands, and Belgium. Notwithstanding this, the most probable hypothesis is that within the old frontiers of that continent before the incorporation by the U. S. S. R. of several territories, the total surface from which linseed was harvested this year in Europe is about the same as the very large one of last years, and that it is 15 per cent. above the average of the last preceding five years, and also that the production, though about the same as in 1939, is about 10 per cent. above the average of the five years ending in 1938.

The particular situation in the linseed producing countries of Europe which have communicated their information to the Institute, may be summarized as follows:

In the group of the Baltic countries, and particularly in Lithuania, Latvia and Esthonia, the excessively dry and rather cold summer was not favourable to the growth of the crop. The information on the crop condition given out by the Government of Lithuania at harvest time, indicated that the production

| COUNTRIES | † AREA | | | | † PRODUCTION | | | | | | | |
|-----------|------------------------|------------------------|--------------------------|--------------------------|------------------------|------------------------|--------------------------|------------------------|------------------------|--------------------------|--------------------------|--------------|
| | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 | % 1940 and 1940-41 | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 | % 1940 and 1940-41 | |
| | | | 1934-35 to 1938-39 | | | | 1934-35 to 1938-39 | | | | 1934-35 to 1938-39 | |
| | | | 1939 and 1940 | Aver- age | | | 1939 and 1940 | | | Aver- age | 1939 and 1940 | Aver- age |
| | ooo acres | | = 100 | = 100 | ooo centals | | ooo lb. | | = 100 | = 100 | | |

[illegible]

| | 1913 | | | | | | | | | | 1914 | | | | | | | | | | 1915 | | | | | | | | | | 1916 | | | | | | | | | | 1917 | | | | | | | | | | 1918 | | | | | | | | | | 1919 | | | | | | | | | | 1920 | | | | | | | | | | 1921 | | | | | | | | | | 1922 | | | | | | | | | | 1923 | | | | | | | | | | 1924 | | | | | | | | | | 1925 | | | | | | | | | | 1926 | | | | | | | | | | 1927 | | | | | | | | | | 1928 | | | | | | | | | | 1929 | | | | | | | | | | 1930 | | | | | | | | | | 1931 | | | | | | | | | | 1932 | | | | | | | | | | 1933 | | | | | | | | | | 1934 | | | | | | | | | | 1935 | | | | | | | | | | 1936 | | | | | | | | | | 1937 | | | | | | | | | | 1938 | | | | | | | | | | 1939 | | | | | | | | | | 1940 | | | | | | | | | | 1941 | | | | | | | | | | 1942 | | | | | | | | | | 1943 | | | | | | | | | | 1944 | | | | | | | | | | 1945 | | | | | | | | | | 1946 | | | | | | | | | | 1947 | | | | | | | | | | 1948 | | | | | | | | | | 1949 | | | | | | | | | | 1950 | | | | | | | | | | 1951 | | | | | | | | | | 1952 | | | | | | | | | | 1953 | | | | | | | | | | 1954 | | | | | | | | | | 1955 | | | | | | | | | | 1956 | | | | | | | | | | 1957 | | | | | | | | | | 1958 | | | | | | | | | | 1959 | | | | | | | | | | 1960 | | | | | | | | | | 1961 | | | | | | | | | | 1962 | | | | | | | | | | 1963 | | | | | | | | | | 1964 | | | | | | | | | | 1965 | | | | | | | | | | 1966 | | | | | | | | | | 1967 | | | | | | | | | | 1968 | | | | | | | | | | 1969 | | | | | | | | | | 1970 | | | | | | | | | | 1971 | | | | | | | | | | 1972 | | | | | | | | | | 1973 | | | | | | | | | | 1974 | | | | | | | | | | 1975 | | | | | | | | | | 1976 | | | | | | | | | | 1977 | | | | | | | | | | 1978 | | | | | | | | | | 1979 | | | | | | | | | | 1980 | | | | | | | | | | 1981 | | | | | | | | | | 1982 | | | | | | | | | | 1983 | | | | | | | | | | 1984 | | | | | | | | | | 1985 | | | | | | | | | | 1986 | | | | | | | | | | 1987 | | | | | | | | | | 1988 | | | | | | | | | | 1989 | | | | | | | | | | 1990 | | | | | | | | | | 1991 | | | | | | | | | | 1992 | | | | | | | | | | 1993 | | | | | | | | | | 1994 | | | | | | | | | | 1995 | | | | | | | | | | 1996 | | | | | | | | | | 1997 | | | | | | | | | | 1998 | | | | | | | | | | 1999 | | | | | | | | | | 2000 | | | | | | | | | | 2001 | | | | | | | | | | 2002 | | | | | | | | | | 2003 | | | | | | | | | | 2004 | | | | | | | | | | 2005 | | | | | | | | | | 2006 | | | | | | | | | | 2007 | | | | | | | | | | 2008 | | | | | | | | | | 2009 | | | | | | | | | | 2010 | | | | | | | | | | 2011 | | | | | | | | | | 2012 | | | | | | | | | | 2013 | | | | | | | | | | 2014 | | | | | | | | | | 2015 | | | | | | | | | | 2016 | | | | | | | | | | 2017 | | | | | | | | | | 2018 | | | | | | | | | | 2019 | | | | | | | | | | 2020 | | | | | | | | | | 2021 | | | | | | | | | | 2022 | | | | | | | | | | 2023 | | | | | | | | | | 2024 | | | | | | | | | | 2025 | | | | | | | | | | 2026 | | | | | | | | | | 2027 | | | | | | | | | | 2028 | | | | | | | | | | 2029 | | | | | | | | | | 2030 | | | | | | | | | | 2031 | | | | | | | | | | 2032 | | | | | | | | | | 2033 | | | | | | | | | | 2034 | | | | | | | | | | 2035 | | | | | | | | | | 2036 | | | | | | | | | | 2037 | | | | | | | | | | 2038 | | | | | | | | | | 2039 | | | | | | | | | | 2040 | | | | | | | | | | 2041 | | | | | | | | | | 2042 | | | | | | | | | | 2043 | | | | | | | | | | 2044 | | | | | | | | | | 2045 | | | | | | | | | | 2046 | | | | | | | | | | 2047 | | | | | | | | | | 2048 | | | | | | | | | | 2049 | | | | | | | | | | 2050 | | | | | | | | | | 2051 | | | | | | | | | | 2052 | | | | | | | | | | 2053 | | | | | | | | | | 2054 | | | | | | | | | | 2055 | | | | | | | | | | 2056 | | | | | | | | | | 2057 | | | | | | | | | | 2058 | | | | | | | | | | 2059 | | | | | | | | | | 2060 | | | | | | | | | | 2061 | | | | | | | | | | 2062 | | | | | | | | | | 2063 | | | | | | | | | | 2064 | | | | | | | | | | 2065 | | | | | | | | | | 2066 | | | | | | | | | | 2067 | | | | | | | | | | 2068 | | | | | | | | | | 2069 | | | | | | | | | | 2070 | | | | | | | | | | 2071 | | | | | | | | | | 2072 | | | | | | | | | | 2073 | | | | | | | | | | 2074 | | | | | | | | | | 2075 | | | | | | | | | | 2076 | | | | | | | | | | 2077 | | | | | | | | | | 2078 | | | | | | | | | | 2079 | | | | | | | | | | 2080 | | | | | | | | | | 2081 | | | | | | | | | | 2082 | | | | | | | | | | 2083 | | | | | | | | | | 2084 | | | | | | | | | | 2085 | | | | | | | | | | 2086 | | | | | | | | | | 2087 | | | | | | | | | | 2088 | | | | | | | | | | 2089 | | | | | | | | | | 2090 | | | | | | | | | | 2091 | | | | | | | | | | 2092 | | | | | | | | | | 2093 | | | | | | | | | | 2094 | | | | | | | | | | 2095 | | | | | | | | | | 2096 | | | | | | | | | | 2097 | | | | | | | | | | 2098 | | | | | | | | | | 2099 | | | | | | | | | | 2100 | | | | | | | | | | 2101 | | | | | | | | | | 2102 | | | | | | | | | | 2103 | | | | | | | | | | 2104 | | | | | | | | | | 2105 | | | | | | | | | | 2106 | | | | | | | | | | 2107 | | | | | | | | | | 2108 | | | | | | | | | | 2109 | | | | | | | | | | 2110 | | | | | | | | | | 2111 | | | | | | | | | | 2112 | | | | | | | | | | 2113 | | | | | | | | | | 2114 | | | | | | | | | | 2115 | | | | | | | | | | 2116 | | | | | | | | | | 2117 | | | | | | | | | | 2118 | | | | | | | | | | 2119 | | | | | | | | | | 2120 | | | | | | | | | | 2121 | | | | | | | | | | 2122 | | | | | | | | | | 2123 | | | | | | | | | | 2124 | | | | | | | | | | 2125 | | | | | | | | | | 2126 | | | | | | | | | | 2127 | | | | | | | | | | 2128 | | | | | | | | | | 2129 | | | | | | | | | | 2130 | | | | | | | | | | 2131 | | | | | | | | | | 2132 | | | | | | | | | | 2133 | | | | | | | | | | 2134 | | | | | | | | | | 2135 | | | | | | | | | | 2136 | | | | | | | | | | 2137 | | | | | | | | | | 2138 | | | | | | | | | | 2139 | | | | | | | | | | 2140 | | | | | | | | | | 2141 | | | | | | | | | | 2142 | | | | | | | | | | 2143 | | | | | | | | | | 2144 | | | | | | | | | | 2145 | | | | | | | | | | 2146 | | | | | | | | | | 2147 | | | | | | | | | | 2148 | | | | | | | | | | 2149 | | | | | | | | | | 2150 | | | | | | | | | | 2151 | | | | | | | | | | 2152 | | | | | | | | | | 2153 | | | | | | | | | | 2154 | | | | | | | | | | 2155 | | | | | | | | | | 2156 | | | | | | | | | | 2157 | | | | | | | | | | 2158 | | | | | | | | | | 2159 | | | | | | | | | | 2160 | | | | | | | | | | 2161 | | | | | | | | | | 2162 | | | | | | | | | | 2163 | | | | | | | | | | 2164 | | | | | | | | | | 2165 | | | | | | | | | | 2166 | | | | | | | | | | 2167 | | | | | | | | | | 2168 | | | | | | | | | | 2169 | | | | | | | | | | 2170 | | | | | | | | | | 2171 | | | | | | | | | | 2172 | | | | | | | | | | 2173 | | | | | | | | | | 2174 | | | | | | | | | | 2175 | | | | | | | | | | 2176 | | | | | | | | | | 2177 | | | | | | | | | | 2178 | | | | | | | | | | 2179 | | | | | | | | | | 2180 | | | | | | | | | | 2181 | | | | | | | | | | 2182 | | | | | | | | | | 2183 | | | | | | | | | | 2184 | | | | | | | | | | 2185 | | | | | | | | | | 2186 | | | | | | | | | | 2187 | | | | | | | | | | 2188 | | | | | | | | | | 2189 | | | | | | | | | | 2190 | | | | | | | | | | 2191 | | | | | | | | | | 2192 | | | | | | | | | | 2193 | | | | | | | | | | 2194 | | | | | | | | | | 2195 | | | | | | | | | | 2196 | | | | | | | | | | 2197 | | | | | | | | | | 2198 | | | | | | | | | | 2199 | | | | | | | | | | 2200 | | | | | | | | | | 2201 | | | | | | | | | | 2202 | | | | | | | | | | 2203 | | | | | | | | | | 2204 | | | | | | | | | | 2205 | | | | | | | | | | 2206 | | | | | | | | | | 2207 | | | | | | | | | | 2208 | | | | | | | | | | 2209 | | | | | | | | | | 2210 | | | | | | | | | | 2211 | | | | | | | | | | 2212 | | | | | | | | | | 2213 | | | | | | | | | | 2214 | | | | | | | | | | 2215 | | | | | | | | | | 2216 | | | | | | | | | | 2217 | | | | | | | | | | 2218 | | | | | | | | | | 2219 | | | | | | | | | | 2220 | | | | | | | | | | 2221 | | | | | | | | | | 2222 | | | | | | | | | | 2223 | | | | | | | | | | 2224 | | | | | | | | | | 2225 | | | | | | | | | | 2226</ | | | | | | | | | |
|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|
|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|------|--|--|--|--|--|--|--|--|--|--------|--|--|--|--|--|--|--|--|--|

1) Including the reannexed north zone and Sub-Carpathia. — 2) Including the reannexed north zone but excluding Sub-Carpathia. — 3) Territory as at end of 1937. — 4) Not including Bessarabia and Northern Bucovina. — 5) "Dolgunetz" variety grown for linseed and flax. — 6) Former territory. — 7) Approximate figure, not official. — 8) Flax and hemp. — 9) Actual territory. — 10) Total: varieties: Dolgunetz and "Kudriash". — 11) Final report. — 12) Area sown.

In Hungary the flax crop cultivated chiefly for linseed gave mediocre yields on the whole of the country. The figures on the surfaces sown to linseed and on production this year are about the same as those of last year in spite of recent increases.

In Germany the economic plan of the Government implying a further extension of the crop in spite of the war, was put into effect without the slightest difficulty.

In Belgium the tendency to an increase of the area to be sown to linseed which had been noticeable during several years, was accentuated in 1940. Figures show that areas actually dedicated to that crop were nearly doubled as compared with the five year average ending in 1938 and are 23 per cent. above last year.

Press information shows that in Italy the area sown to linseed this year is slightly larger than that of last year, as it appears from the statements of the farmers regarding the deliveries of linseed to the "Ammassi Volontari". On the whole, the growth of the crop was regular, and the damage done to the plants by maladies and pests were generally of little importance.

In the United Kingdom the Government adopted several measures to increase the areas to be sown to linseed in 1940. Among them, the Government granted a premium of £2 per acre worked and reserved to the linseed crop and guaranteed its marketing by the adoption of official prices which were fixed on the basis of the prices of imported linseed.

In Romania the crop of linseed was considerably increased in compliance with the adoption of the five year agricultural plan, that, among other things, included for the current year, an intensification of the crops of textile and oleaginous plants which for some years had been receding. The figure for 1940, which does not consider the recent territorial changes in that country, is 56 per cent. above that of 1939, but 22 per cent. lower than the average of the preceding five years.

In the Protectorate of Bohemia and Moravia weather conditions were generally favourable to the linseed crop, of which the flowering was, on the whole, normal. Notwithstanding damages caused in some sections by laying, yields were generally satisfactory.

As regards Poland and France information is lacking, but it is quite probable that the crop of linseed in those countries was considerably reduced.

In Yugoslavia the weather was too damp during spring and part of the summer causing stem maladies and reducing the yields in grains. In spite of that, very recent information indicates that the production this year should not be much lower than that of last year owing to the remarkably large area sown to linseed.

In the Soviet Union the beginning of spring was characterised by instability of the weather and sudden changes of temperature which slowed down the works in the fields and the sowings. But later, upon the return of fine weather, the growth of the crop was so quickened that not only was the delay made up for, but the dates of last year were surpassed. At 15th June, the plan of sowing in the collective farms, which represent the whole of the crop of linseed of the "Dolgunetz" variety in the Union, had been completed up to 99.8 per cent. as against 99.4 per cent. at the same date last year. The figure set by the plan for this variety which is used for the production of flax and linseed, is about the same as last year (4,448,000 acres), but 13.2 per cent. lower than the average of the preceding five years. As regards the "Kudriash" variety, figures for the last two years are still lacking. This variety is especially cultivated for the production of linseed. There is a tendency to an increase of the area sown to it, as shown by the fact that against 608,000 acres in 1934, 870,000 acres,

were turned over to this crop in 1938. Available information indicates that the results obtained in the most important centers of production in the Union, forecast a satisfactory crop.

The amount of the Soviet crop of this oleagineous plant was normally above 20 per cent. of the world production. This amount was almost entirely absorbed by the home market. Following the occupation of Poland,—which on the European continent ranked first among the linseed producing countries with a production, during the last years, of about 1,540,000 centals (2,750,000 bushels), nearly 75 per cent. of the Polish production went to the Soviet Union. Lastly, by the incorporation of Lithuania, Latvia and Esthonia which in 1939 produced altogether 1,407,000 centals (2,512,000 bushels) (the production of Northern Bukovina and Bessarabia is nearly negligible, registering hardly 11,000 centals (20,000 bushels in 1939), the relative importance of the Soviet Union as a world producer of linseed has grown very considerably, having absorbed nearly 50 per cent. of the entire European production.

In North America, both the United States and Canada show a tendency to increase the area sown to linseed. In the United States the linseed acreage has been increased this year 56 per cent. as compared with 1939 and 160 per cent. as compared with the average of the five years ending in 1938. This exceptional increase in the United States must be attributed to the protective measures adopted under the regime of the *Agricultural Conservation Program*, to the rather high level of linseed prices on the home market and to the high yields obtained last year in the chief linseed producing sections of the country. According to the most recent official estimate of October 1, the production of linseed grains in the United States this year attained 17,152,000 centals (30,629,000 bushels), i. e., 51 per cent. above the already high level of 1939, and 276 per cent. above the average of the preceding years: 4,558,000 centals (8,139,000 bushels).

In Canada, the Government has also encouraged the intensification of the crop of linseed, especially in the Prairie Provinces which are the most important producing center of the country. The area sown to linseed this year shows an increase of 29 per cent. compared with last year and 36 per cent. compared with the average of the five years ending in 1938. The weather was very favourable to the growth of the plants, and the production of 1940 in Canada shows very important proportional increases that amount respectively to 61 per cent and 172 per cent. The quality of the product is good and, and the oil contents, as in the United States, is very high.

The total production in 1940 in these two American countries is thus very abundant: 19,106,000 centals (34,119,000 bushels) i. e. 52 per cent. above the already satisfactory production of 1939: 12,600,000 centals (22,499,000 bushels) and 262 per cent. above the average of the five preceding years: 5,275,000 centals (9,420,000 bushels).

In India the area sown to linseed this year was not as large as last year, it being 4 per cent. less, but about 5 per cent. above the average area of the five preceding years. The production obtained in that country 10,461,000 centals (18,680,000 bushels) favoured by good weather conditions especially in the Central Provinces which are the most important linseed

center in India, is 5.7 per cent. above last year's crop: 9,901,000 centals (17,680,000 bushels) and 12.5 per cent. above the average of the preceding five years ending in 1938: 9,296,000 centals (16,600,000 bushels).

The information available for Argentina, which is well known as holding an absolutely preponderant rank in the world production of linseed, indicates that the work in the soil and the sowings this year were delayed by excessive rains in May, June and July. The delay in the work in the fields was especially noticeable in the zones sown to maize, where the harvest of the crop was hindered by bad weather. In August the condition of the crop was excellent in the provinces of Córdoba and Santa Fé. On the contrary the condition of the early varieties was rather uncertain in the Province of Entre Ríos, on account of too much dampness. The last official report, issued at the beginning of October, shows that the condition of the crop towards the end of

Linseed areas sown and harvested in Argentina.

| YEARS | AREAS SOWN | | | AREAS HARVESTED | |
|--|---------------|-----------------|--------------|-----------------|-----------------------------------|
| | 1st estimates | Final estimates | Difference | Final estimates | % of final estimates of sown area |
| | (1,000 acres) | (1,000 acres) | % | (1,000 acres) | % |
| 1940-41 | 6,672 | (1) 6,795 | (1)+ 1.8 | ... | ... |
| 1939-40 | 7,413 | 7,599 | + 2.5 | ... | ... |
| 1938-39 | 6,870 | 6,608 | - 3.8 | 5,738 | 86.8 |
| 1937-38 | 6,301 | 7,023 | + 11.5 | 5,691 | 81.0 |
| 1936-37 | 7,290 | 8,646 | + 18.6 | 7,626 | 88.2 |
| 1935-36 | 6,128 | 6,573 | + 7.3 | 5,607 | 85.3 |
| 1934-35 | 7,216 | 8,103 | + 12.3 | 7,104 | 87.7 |
| <i>Average 1934-35/1938-39</i> | <i>6,761</i> | <i>7,391</i> | <i>+ 9.3</i> | <i>6,353</i> | <i>86.6</i> |
| 1933-34 | 6,919 | 6,855 | - 0.9 | 4,878 | 71.2 |
| 1932-33 | 7,290 | 7,401 | + 1.5 | 6,395 | 86.4 |
| 1931-32 | 8,204 | 8,641 | + 5.3 | 8,263 | 95.6 |
| 1930-31 | 7,537 | 7,512 | - 0.3 | 6,749 | 89.8 |
| 1929-30 | 7,166 | 7,090 | - 1.1 | 5,231 | 73.8 |
| <i>Average 1929-30/1933-34</i> | <i>7,423</i> | <i>7,500</i> | <i>+ 1.0</i> | <i>6,303</i> | <i>84.1</i> |

(1) Second estimate.

September varied from good to excellent in the whole of the country. This situation, however, may change altogether anytime till harvest time. In fact the months from October to December are the most critical period for the linseed crop in Argentina, and any estimate about the yield at this time of the year is fraught with too many uncertain elements, owing to the numerous risks to which the crop is still exposed. The influence of these unfavourable factors is very changeable from year to year. An indirect index of this varia-

bility is furnished by the table showing the differences between the final figures of the sown area and the corresponding figures of the harvested area which show, in the course of the time indicated in the table, variations from a minimum of 4.4 per cent. in 1931-32 and a maximum of 28.8 per cent. in 1933-34.

According to the preliminary estimate made last month by the Argentine Government, the area sown to linseed this year shows a decrease of 12.8 per cent. as compared with last year's final figure, and of about 10 per cent. as compared with the average. On October 22 the Argentine Government published a new estimate which gives the area sown as amounting to 6,795,000 acres i. e. an increase of 124,000 acres compared with the preliminary estimate, as against 7,600,000 acres of the last campaign and 7,391,000 acres as the average for the five years ending in 1938/39; percentages 89.4 and 91.9.

On the basis of this last estimate on the area and on the crop condition as it results from the last official data at the beginning of October, it can be forecast that the Argentine production of linseed crop in 1940/41 will be clearly higher than the very poor crop of 1939/40, 22,364,004 centals (39,935,000 bushels) and, without however reaching it, it may come near the average production of the preceding five years: 37,312,000 centals (66,629,000 bushels). This extremely approximate estimate is based on the supposition that from now up to harvest the weather be normal and that the crop will not be damaged by unforeseen causes.

Data about the area sown to linseed in Uruguay in 1940-41 show a decrease of 21 per cent as compared with the preceding season, but 24 per cent above the average of the five years ending in 1938-39. This decrease must be attributed both to unfavourable weather conditions which retarded and considerably hindered sowings, and to surpluses from the previous season. At the middle of October the state of the crop appeared less omising than in Argentina. Here, as well as in Argentina, the final result of the campaign is subordinated to the trend of the season up to the middle of December when the harvesting and threshing of linseed are being attended to in earnest.

The linseed crop in Egypt, over a surface nearly equal to that of 1939, but 62 per cent. greater than the average, was, on the whole, satisfactory. In fact the production has been 11 per cent. higher than last year and 43 per cent above the average.

In July the estimate on the linseed crop in Morocco was also statisfactory.

The chief characteristics of the present linseed season in the world may be summarized and stated in the following manner. In Europe, notwithstanding the abnormal situation due to the state of war and the unfavourable course of the season, it may be expected that the production of linseed will be above average, but in a lower proportion to the increase of area. The crop has been decisively abundant in North America, both on account of increased area and of very favourable weather conditions. Production was equally good in India with yields far above those of last year and of the average. Forecasts are favourable regarding the production in the Soviet Union and North Africa. Lastly, under the reserves made above, it may be expected that in Argentina the linseed production will be greater than last year and near enough

the average. In Uruguay the forecast is for a rather satisfactory crop. The total linseed production of the 1940-41 season can be considered clearly greater than that of last year.

A. DI FULVIO.

CURRENT INFORMATION ON FLAX.

U. S. S. R.: At the end of September the harvest of flax (Dolgounetz variety) in the collective farms which constitute practically the totality of this crop in the Soviet Union, had been completed over 4,371,000 acres, i. e., 98 per cent. of the sown acreage, as against 4,358,000 acres, i. e., 99 per cent. at the same date last year.

Flax harvested over 3,947,000 acres representing 90 per cent. of the area harvested up to September 30, was put on the fields or in water for setting. Nearly 30 per cent. of the retted product had already been removed.

CURRENT INFORMATION ON COTTON.

Bulgaria: Cold and rainy weather during the first two weeks in September hindered ripening and the work of cotton picking. Thanks to warmer and sunny weather, great progress was made in the second part of the month.

Greece: Rainy at the beginning, the month of September was generally fair and warm, turning to rain again at the end. On the whole these weather conditions were favourable to the ripening and opening of bolls. Slight attacks from insects are reported in some localities; but generally speaking, crop condition at the middle of September, when the picking was in full swing in several districts, was rather satisfactory, and the crop gave promise of a fine yield.

U. S. S. R.: Towards the end of September the picking of cotton was in full swing all over the cotton zones of the Union. The results obtained during the first picking days showed that the figures of the plan for deliveries to the State may be exceeded. In the region of Fergana, which is one of the chief cotton zones of Uzbekistan, the forecast is for an average yield of unginned cotton of not less than from 2,050 to 2,140 lb. per acre, against 1,945 lb. last year. In Central Asia warm and sunny weather was favourable to picking. In some zones however the work is being carried on rather slowly, owing (in some cases) to a delay in the ripening of cotton.

In Uzbekistan, which is the most important center of cotton production in the Union, at September 20 the plan of cotton picking had been completed only by 8.5 per cent.; in Turkmenistan, by the same date, 18.6 per cent. as against 14.6 per cent. at the same date last year.

In non-irrigated cotton regions, the necessary measures were being taken to pick up the cotton at the proper time, without exposing the crop to the danger of autumn frosts which often cause considerable damage.

Argentina: The preparation of the soil and the first sowings were effected under favourable conditions.

United States: According to the Government weekly reports on weather conditions, at the beginning of October cotton picking and ginning were only fairly active, while low temperature retarded development of remaining cotton bolls. During the week ending October 8, conditions bettered and cotton progress continued satisfactory. By October 22, favourable weather conditions having prevailed during two weeks, cotton progress was generally good.

Crop condition as reported on October 1, is the highest on record except for 1937, when it was at 79.

Summary of the Cotton Reports
issued by the Government of the United States, during
the cotton season (August 1-July 31).

| | Provisional estimates for dates indicated 1940-41 | Final estimates | | Percent. 1940-41 | |
|---|---|-----------------|----------------------------------|---------------------|----------------|
| | | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 = 100 | Aver. = 100 |
| Report referring to July 1: | | | | | |
| Area in cultivation (acres) | 25,077,000 | 24,683,000 | 29,132,000 | 101.6 | 86.1 |
| Report referring to August 1: | | | | | |
| Area left for harvest (acres) (1) | 24,616,000 | (2) 23,805,000 | (2) 28,400,000 | 103.4 | 86.7 |
| Crop condition (per cent. of normal) . . | 72 | 74 | (3) 71 | — | — |
| Production (4) | 11,429,000 | 11,816,000 | 12,713,000 | 96.7 | 89.9 |
| Yield of lint per acre, in lb. | 222.3 | 237.9 | (3) 198.1 | 93.4 | 112.3 |
| Cotton ginned to August 1 (5) | 32,187 | 137,254 | 107,222 | 23.5 | 30.0 |
| Cotton ginned to August 16 (5) | 169,420 | 357,197 | 341,902 | 47.4 | 49.6 |
| Report referred to 1 September: | | | | | |
| Area left for harvest (acres) (6) | 24,406,000 | (2) 23,805,000 | (2) 28,400,000 | 102.5 | 85.9 |
| Crop condition (per cent. of normal) . . | 74 | 70 | (3) 62 | — | — |
| Production (4) | 12,772,000 | 11,816,000 | 12,713,000 | 108.1 | 100.5 |
| Yield of lint per acre, in lb. | 250.7 | 237.9 | (3) 198.1 | 105.4 | 126.6 |
| Cotton ginned to September 1 (5) | 606,291 | 1,401,691 | 1,424,427 | 43.3 | 42.6 |
| Cotton ginned to September 16 (5) | 1,804,490 | 3,876,616 | 3,410,335 | 46.5 | 52.9 |
| Report referred to October 1: | | | | | |
| Crop condition (per cent. of normal) . . | 72 | 68 | (3) 62 | — | — |
| Production (4) | 12,741,000 | 11,816,000 | 12,713,000 | 107.8 | 100.2 |
| Yield of lint per acre, in lb. | 250.0 | 237.9 | (3) 198.1 | 105.1 | 126.2 |
| Cotton ginned to October 1 (5) | 3,924,000 | 6,686,712 | 6,012,716 | 58.7 | 65.3 |
| Cotton ginned to October 18 (5) | 7,028,141 | 8,877,681 | 8,379,164 | 70.2 | 83.9 |

(1) Area in cultivation on July 1 less the ten-year (1930-39) average abandonment, from natural causes, 1.9 per cent. — (2) Area actually harvested. — (3) Ten-year (1929-38) average. — (4) In bales of 478 lb. net weight and exclusive of linters. — (5) In running bales, counting round bales as half bales and exclusive of linters. — (6) Per cent. of the acreage in cotton on July 1, 1940, which has been, or will be, abandoned, from natural causes: 2.6.

CURRENT INFORMATION ON HEMP.

Yugoslavia: At the beginning of October the harvest and the works of retting of hemp were over nearly everywhere in the country. A good crop is forecast, especially in the regions of Vojvodina.

U. S. S. R.: By September 25 the cutting of hemp had been done over a surface of 533,000 acres, i. e., 53 per cent. of the surface cultivated to hemp this year, as against 416,000 acres last year, i. e., 42 per cent.

Argentina: The work in the fields for the next sowings of hemp have made good progress.

CURRENT INFORMATION ON TOBACCO.

Greece: Owing to the difficulty of disposing of the tobacco crop of last year, the surface planted to tobacco this year has been considerably reduced. Information from unofficial sources would indicate that, in spite of the not altogether favourable conditions of the crops during July and August, the production will be satisfactory enough and not much different from that of last year. Its quality may even be better than last year. The decrease of the tobacco production this year will thus be exclusively due to the reduction of the surfaces sown to it.

According to the most recent unofficial estimate the area cultivated to tobacco this year will be about 173,000 acres against 208,000 in 1939 and 219,300 on the average of the five years ending 1938; percentages 83.2 and 78.9. The corresponding production is estimated at about 99.2 millions of lb. against 121.2 millions of lb. and 126.2 millions of lb.; percentages 81.9 and 78.6.

Hungary: At the beginning of October the gathering of tobacco leaves had been done nearly everywhere. The leaves are generally large and free from faults due to maladies. Plants left for the production of seeds promise a good yield.

According to the latest estimates, the production of tobacco this year in Hungary, including the reincorporated northern zone Subcarpathia except northern Transylvania, amounts to 36,446,000 lb. In 1939, in the territory including the northern reincorporated zone, it amounted to 47,434,000 lb. The average for the years 1934-1938 up to the end of 1937 is 45,141,000 lb.

The unit yield was 1,250 lb. per acre in 1940, 1,160 lb. in 1939 and 1,220 lb. average during the years 1934-1938.

Yugoslavia: The tobacco crop this year appears to be very large, especially in Herzegovina.

U. S. S. R.: The surface sown to "Makhorka" during the present campaign is 262,000 acres, i. e., nearly the same as the average of the five years 1934-38 which had been 263,000 acres. The production of "Makhorka" is estimated at 374,787,000 lb., as against 286,602,000 lb., in 1939.

The surface sown to yellow tobacco during the present season is over 223,000 acres. This acreage is about 3 per cent. less than the average of the preceding five years. Unit yields are high in the most important zones where yellow tobacco is grown.

Argentina: The elaboration of tobacco of the last season is over. Nurseries are now being prepared for the next transplantations.

United States: According to the October Crop Report, the production of tobacco in 1940 is estimated at 1,268,912,000 lb. against 1,848,654,000 lb. in 1939 and an average of 1,294,694,000 lb. in 1934 to 1938; percentages, 68.6 and 98.0.

CURRENT INFORMATION ON HOPS.

Yugoslavia: Weather conditions during the month of September were favourable to the growth and harvest of hops. According to the most recent information, the hops this year will be abundant.

United States: According to the October Crop Report the production of hops in 1940 is estimated at 40,260,000 lb. against 39,380,000 lb. in 1939 and an average of 40,029,000 lb. in 1934 to 1938; percentages, 102.2 and 100.6.

CURRENT INFORMATION ON OTHER PRODUCTS.

Coffee.

Brazil: Since the beginning of the new commercial campaign, the policy of destruction of coffee has been considerably accentuated. In fact the quantity of coffee withdrawn from the market during July and August this year amounts to 1,135,400 centals, as against hardly 998,700 centals during the six months January-June 1940.

The surplus stocks destroyed in Brazil since 1931 up to August 31, 1940, amount to 92,418,000 centals.

Venezuela: In August the condition of the coffee plantations was generally good, and a rather fine production was expected during the present season.

Philippine Islands: The production of coffee of the 1940-41 season is officially estimated at about 26,000 centals, against 22,000 centals of last year and an average of 18,500 centals during the preceding five years.

Percentages: 118.3 and 142.1. The total acreage from which this year production has been obtained is 4,045 acres, i. e., only slightly greater than last year.

New Hebrides: The last official report on the present campaign confirms that the production of coffee is satisfactory.

Groundnuts.

Argentina: Weather conditions during the last two months were generally favourable to the preparatory works of the soil for the sowing of ground nuts.

Colza.

Hungary: At the beginning of October colza had been mostly sown. Early seedlings budded uniformly and are growing well.

Romania: Winter colza has been sown over a smaller surface than last year. Owing to the draught, germination has been bad. It must be taken into account that, owing to territorial cessions, the surface ordinarily sown to colza in Romania, has been reduced by about 45 per cent.

Yugoslavia: The colza crop of 1940 appears to be rather poor. For this reason, conversations with Turkey have been started for the importation of colza from that country. The sowings of winter colza were carried on under favourable conditions.

CURRENT INFORMATION ON FODDER CROPS.

Bulgaria: Frequent rains in the first half of September were favourable to the vegetation of fodder crops. Dry and warm weather towards the end of the month slightly damaged the production.

Finland: At the beginning of October the state of the culture of artificial and natural meadows was bad. In the system of the country it was expressed respectively by 3.6 and 3.4.

Hungary: At the beginning of October forage beets were growing well and a good crop was expected. Here and there harvesting had begun. The mowing and transportation of green forage maize and moha were going on: yields are very high.

The yield of the second cut of clover has been average as to quality, but good as to quantity, while the third cut has been good both as to quality and quantity. The cut of clover sown in stubble fields was being effected. The harvest of the third cut of lucerne has given good results. Good results are expected also from the fourth cut. The clover and lucerne crops destined to the production of seed grains do not seem very promising. The common and broom millet crop is somewhat above the average, while the buckwheat crop is average. The second crop of natural meadows is of an average quality, but very good as to quantity. The vegetation of pastures was still very vigorous at the beginning of October, and the cattle found sufficient nourishment.

Sweden: Thanks to rains, fodder crops are growing vigorously and average productions are forecast. At the beginning of October the state of the cultures of artificial meadows was quoted 2.1, as at the beginning of September, and 2.9 at the beginning of October 1939. The corresponding figures for natural meadows were 2.3 and 3.1.

Yugoslavia: The dry season which prevailed during the month of July and the second half both of August and September, have considerably hindered the normal growth of alfalfa and clover, the production of which appears to be rather scarce in spite of frequent rains in the first two weeks of August and September.

U. S. S. R.: The surface sown to fodder crops this year has been increased by about 4,942,000 acres. The hay production of natural meadows is considerably above that of last year. The abundant fodder production allows a further increase in cattle raising in the Union.

Argentina: On the whole, the condition of pastures and artificial meadows in the month of September was good.

United States: According to the most recent estimate area cultivated to tame hay this year is 60,573,000 acres against 58,347,000 in 1939 and 56,100,000 on the average of the five years ending 1938; percentages 103.8 and 108.0. The corresponding production of hay, all tame, is estimated at about 1,690,080,000 centals (84,504,000 short tons) against 1,514,520,000 (75,726,000) and 1,405,764,000 (70,288,000); percentages 111.6 and 120.2.

LIVESTOCK AND DERIVATIVES

HORSES, CATTLE AND POULTRY IN DENMARK. (*)

(Thousands)

| CLASSIFICATION | 29 June 1940 | 16 July 1939 | 16 July 1938 | 17 July 1937 | 15 July 1933 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|
| <i>Horses</i> | 574 | 577 | 565 | 552 | 501 |
| Colts under 1 year | 52 | 53 | 50 | 50 | 25 |
| Colts from 1 to 3 years | 93 | 92 | 88 | 79 | 40 |
| Stallions 3 years old and over | 4 | 4 | 4 | 4 | 3 |
| Geldings 3 years old and over | 200 | 203 | 202 | 201 | 207 |
| Mares 3 years old and over | 225 | 225 | 220 | 218 | 226 |
| <i>Cattle</i> | 3,221 | 3,271 | 3,186 | 3,054 | 3,134 |
| Calves under 1 year old | 861 | 852 | 834 | 763 | 685 |
| Bulls 1 year old and over | 63 | 68 | 63 | 64 | 78 |
| Steers | 74 | 78 | 80 | 80 | 59 |
| Heifers 1 year old and over | 634 | 659 | 610 | 603 | 542 |
| Cows and heifers having farrowed | 1,589 | 1,614 | 1,599 | 1,574 | 1,770 |
| <i>Fowls</i> | 24,551 | 32,398 | 27,864 | 26,498 | 25,550 |
| Chicken under 6 months | 10,657 | 18,680 | 15,732 | 13,052 | 13,463 |
| Cocks 6 months old and over | 161 | 188 | 174 | 194 | 314 |
| Hens 6 months old and over | 13,733 | 13,530 | 11,958 | 13,252 | 11,773 |

(*) Rural districts.

PIG POPULATION IN DENMARK. *

(Thousand head)

| CLASSIFICATION | 1940 | | | | | | 1939 | | | | | |
|--|-------------|------------|------------|----------|-------------|-------------|------------|------------|-----------|------------|------------|------------|
| | Sept. 21 | Aug. 10 | June 29 | May 4 | March 23 | Febr. 10 | Dec. 30 | Nov. 18 | Oct. 7 | Aug. 26 | July 15 | June 17 |
| Boars for breeding. | 14 | 16 | 17 | 17 | 18 | 17 | 17 | 17 | 18 | 18 | 18 | 17 |
| Sows in farrow for first time . . . | 23 | 30 | 49 | 71 | 89 | 89 | 80 | 63 | 62 | 65 | 76 | 82 |
| Othersows in farrow | 120 | 137 | 146 | 151 | 165 | 169 | 162 | 176 | 189 | 192 | 171 | 163 |
| Sows in milk . . . | 64 | 73 | 90 | 101 | 88 | 80 | 95 | 86 | 81 | 85 | 99 | 101 |
| Sows not yet covered (and not for slaughter) . | 38 | 41 | 34 | 26 | 24 | 25 | 21 | 24 | 25 | 27 | 27 | 23 |
| Sows for slaughter. | 26 | 18 | 15 | 17 | 16 | 12 | 12 | 15 | 15 | 9 | 10 | 9 |
| Total sows | 271 | 299 | 334 | 366 | 382 | 375 | 370 | 364 | 372 | 378 | 383 | 378 |
| Sucking pigs not weaned | 539 | 617 | 756 | 807 | 734 | 662 | 804 | 735 | 696 | 731 | 841 | 862 |
| Young and adult pigs for slaughter: | | | | | | | | | | | | |
| Weaned pigs under 35 kg. . . | 755 | 850 | 839 | 690 | 712 | 769 | 749 | 732 | 767 | 839 | 771 | 660 |
| Pigs of 35 and under 60 kg. . | 665 | 690 | 628 | 628 | 686 | 659 | 657 | 697 | 766 | 663 | 641 | 589 |
| Fat pigs of 60 kg. and over . | 497 | 519 | 625 | 626 | 534 | 558 | 537 | 685 | 573 | 535 | 473 | 491 |
| Total pigs | 2,741 | 2,991 | 3,199 | 3,134 | 3,066 | 3,040 | 3,134 | 3,230 | 3,192 | 3,164 | 3,127 | 2,997 |

* Rural districts.

CURRENT INFORMATION ON LIVESTOCK AND DERIVATIVES.

Switzerland: According to the results of a survey by the Swiss Peasants' Union, during the month of August 1940, the Swiss cheese factories and the collecting centres received 1.3 % more milk than in the same month last year. This increase in the production took place chiefly in the Cantons of the north-east of Switzerland while in Romanic Switzerland milk deliveries were lower than in August 1939. Weather conditions which were favourable to the hay crops, had also a favourable influence on the production of milk.

Argentina: In September the state of health of cattle was good.

CURRENT INFORMATION ON SERICULTURE.

Turkey: The production of fresh cocoons in 1939 is estimated at 4,596,000 lb. against 5,177,000 in 1938 and an average of 4,427,000 in 1933 to 1937, percentages, 88.8 and 103.8.

TRADE

| COUNTRIES | AUGUST | | | | TWELVE MONTHS (August 1-July 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|---|-----------------|-------|------------------|-------|----------------------------------|--------------------|---------------------|------------------------|-------------------------------------|--------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Wheat. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 15 | 902 | 0 | 0 | 18,650 | 27,571 | 0 | 0 | — | — |
| Yugoslavia | 2 | 1,432 | 0 | 0 | 5,431 | 3,246 | 0 | 0 | — | — |
| United States | 560 | 3,542 | 356 | 567 | 13,134 | 46,058 | 6,173 | 6,134 | — | — |
| Argentina | 6,085 | 9,423 | — | — | 104,945 | 70,370 | — | — | — | — |
| Iraq | 7 | 106 | 0 | 0 | 1,092 | 621 | 0 | 0 | — | — |
| Turkey | 23 | 51 | — | — | 1,402 | 1,098 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 609 | 992 | 0 | 0 | 7,156 | 7,740 | — | — |
| Portugal | 0 | 0 | 0 | 39 | 0 | 0 | 535 | 1,295 | — | — |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 40 | (¹) 1,078 | 0 | 1,243 |
| China | 2 | 35 | 218 | 533 | 263 | 511 | 3,081 | 9,597 | — | — |
| Wheat Flour. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | — | — |
| Yugoslavia | 6 | 0 | 0 | 0 | 325 | 32 | 0 | 0 | — | — |
| United States | 852 | 1,265 | 18 | 26 | 11,758 | 13,982 | 129 | 159 | — | — |
| Argentina | 125 | 151 | — | — | 1,951 | 2,049 | — | — | — | — |
| Iraq | 11 | 9 | 0 | 0 | 176 | 153 | 0 | 0 | — | — |
| Turkey | 0 | 0 | — | — | 1 | 75 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 3 | 0 | 0 | 35 | 43 | — | — |
| Portugal | 0 | 0 | 0 | 3 | 0 | 0 | 12 | 38 | — | — |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 2 | (¹) 1 | 0 | 2 |
| China | 18 | 94 | 454 | 938 | 856 | 1,176 | 5,994 | 7,108 | — | — |
| Total Wheat and Flour †). — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | NET EXPORTS (*) | | NET IMPORTS (**) | | NET EXPORTS (*) | | NET IMPORTS (**) | | N. EX. (*) | N. IMP. (**) |
| Greece | — | — | 610 | 997 | — | — | 7,203 | 7,797 | — | — |
| Portugal | — | — | 0 | 43 | — | — | 551 | 1,345 | — | — |
| Romania | 15 | 926 | — | — | 18,653 | 27,574 | — | — | — | — |
| Yugoslavia | 11 | 1,433 | — | — | 5,864 | 3,289 | — | — | — | — |
| United States | 1,316 | 4,626 | — | — | 22,467 | 58,432 | — | — | — | — |
| Mexico | 6,252 | 9,625 | ... | ... | 107,547 | 73,102 | (¹) 42 | (¹) 1,079 | — | 1,246 |
| Argentina | — | — | 797 | 1,622 | — | — | 9,668 | 16,996 | — | — |
| China | 20 | 118 | — | — | 1,327 | 825 | — | — | — | — |
| Iraq | 22 | 51 | — | — | 1,404 | 1,198 | — | — | — | — |
| Turkey | — | — | — | — | — | — | — | — | — | — |
| Rye. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| Romania | 8 | 61 | 0 | 0 | 2,172 | 640 | 0 | 0 | — | — |
| United States | 0 | 0 | 0 | 0 | 411 | 374 | 0 | 0 | — | — |
| Argentina | 0 | 354 | — | — | 5,664 | 2,076 | — | — | — | — |
| Turkey | 0 | 24 | — | — | 195 | 177 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | — |

(*) Excess of exports over imports. — (**) Excess of imports over exports.

†) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.333 centals of grain.

(1) Up to April 30.

| COUNTRIES | AUGUST | | | | TWELVE MONTHS (August 1-July 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|---------|-------|---------|------|----------------------------------|---------------------|----------------------|----------------------|----------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| | | | | | | | | | | |
| Barley. Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 943 | 0 | 0 | 2,329 | 4,195 | 0 | 0 | — | — |
| United States | 74 | 339 | 83 | 92 | 1,645 | 5,101 | 290 | 237 | — | — |
| Argentina | 160 | 173 | — | — | 8,848 | 4,644 | — | — | — | — |
| Iraq | 9 | 482 | 0 | 0 | 5,167 | 4,583 | 0 | 0 | — | — |
| Turkey | 0 | 156 | — | — | 1,037 | 2,740 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 3 | 0 | 0 | 54 | 344 | — | — |
| Mexico | ... | ... | ... | ... | (¹) 1 | (¹) 0 | (¹) 128 | (¹) 80 | 0 | 146 |
| Oats. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | — |
| United States | 1 | 2 | 262 | 137 | 65 | 1,114 | 3,635 | 427 | — | — |
| Argentina | 38 | 655 | — | — | 8,397 | 6,118 | — | — | — | — |
| Turkey | 0 | 6 | — | — | 6 | 231 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 165 | 0 | — | — |
| Mexico | ... | ... | ... | ... | (¹) 10 | (¹) 0 | (¹) 6 | (¹) 23 | 0 | 25 |
| Maize. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 1,218 | 215 | 0 | 0 | 13,272 | 11,766 | 0 | 0 | 12,014 | 0 |
| Yugoslavia | 12 | 84 | 0 | 0 | 26 | 2,311 | 0 | 0 | 2,334 | 0 |
| United States | 1,866 | 609 | 44 | 9 | 20,205 | 15,691 | 580 | 218 | 19,783 | 253 |
| Argentina | 3,304 | 5,664 | — | — | 43,248 | 64,332 | — | — | 75,057 | — |
| Iraq | 0 | 1 | — | — | 1 | 3 | — | — | 3 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 123 | 63 | 0 | 0 | 445 | 1,308 | 0 | 1,336 |
| Portugal | 0 | 0 | 34 | 97 | 0 | 0 | 254 | 787 | 0 | 864 |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 0 | (¹) 563 | (¹) 512 | 0 | 807 |
| Rice. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| United States | 192 | 222 | 52 | 72 | 2,183 | 2,199 | 291 | 569 | 3,093 | 711 |
| Mexico | ... | ... | ... | ... | (¹) 0 | (¹) 39 | (¹) 0 | (¹) 0 | 49 | 0 |
| Iraq | 3 | 0 | 0 | 0 | 6 | 10 | 0 | 1 | 15 | 1 |
| Thailand | 3,372 | 3,121 | — | — | 25,056 | 26,414 | — | — | 40,773 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 27 | 39 | 0 | 0 | 515 | 506 | 0 | 647 |
| Portugal | 0 | 0 | 12 | 12 | 0 | 0 | 66 | 38 | 0 | 104 |
| Romania | — | — | 8 | 8 | — | — | 207 | 309 | — | 360 |
| Yugoslavia | 0 | 0 | 0 | 31 | 0 | 0 | 145 | 262 | 0 | 394 |
| China | 2 | 3 | 1,339 | 361 | 107 | 148 | 10,690 | 5,677 | 156 | 7,060 |

(¹) Up to April 30.

| COUNTRIES | AUGUST | | | | EIGHT MONTHS (January 1-August 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|--|---------|--------|---------|--------|------------------------------------|------------------------|------------------------|------------------------|--------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Linseed. — Thousand cents (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 3 | 0 | 0 | 2 | 6 | 2 | 3 | 2 |
| Argentina | 256 | 2,138 | — | — | 13,966 | 20,588 | — | — | 26,082 | — |
| China | 9 | 5 | — | — | 16 | 84 | — | — | 99 | — |
| Iraq | 0 | 24 | — | — | 13 | 41 | — | — | 63 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 0 | 13 | 0 | 0 | 24 | 58 | 0 | 71 |
| Portugal | — | — | 18 | 0 | — | — | 61 | 22 | — | 161 |
| United States | — | — | 352 | 846 | — | — | 5,172 | 7,503 | — | 8,976 |
| Cotton. — Thousand cents (1 cental = 100 lb.). | | | | | | | | | | |
| | | | | | TWELVE MONTHS (August 1-July 31) | | | | TWELVE MONTHS (August 1-July 31) | |
| | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| United States | 346 | 1,159 | 51 | 67 | 32,714 | 17,562 | 841 | 749 | — | — |
| Mexico | — | — | — | — | (¹) 104 | (²) 281 | (¹) 13 | (²) 5 | 308 | 9 |
| Argentina | 41 | 86 | — | — | 573 | 555 | — | — | — | — |
| Perou | — | — | — | — | — | — | — | — | (¹) 1,452 | — |
| Iraq | — | 8 | 0 | 1 | 57 | 53 | 3 | 2 | — | — |
| Turkey | 0 | 9 | — | — | 129 | 385 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 0 | 0 | 8 | 4 | 0 | 0 | 89 | 49 | — | — |
| Portugal | — | — | 23 | 26 | — | — | 566 | 474 | — | — |
| Romania | 0 | 0 | 15 | 19 | 0 | 0 | 306 | 433 | — | — |
| Yugoslavia | 0 | 0 | 8 | 23 | 0 | 0 | 454 | 515 | — | — |
| China | 2 | 21 | 453 | 674 | 87 | 1,305 | 5,762 | 3,698 | — | — |
| Wool. — Thousand lb. | | | | | | | | | | |
| | | | | | TWELVE MONTHS (Sept. 1-August 31) | | | | TWELVE MONTHS (Sept. 1-Aug. 31) | |
| | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Argentina (a) | 7,412 | 8,567 | — | — | 203,236 | 299,135 | — | — | — | — |
| Perou (b) | 3,433 | 3,605 | — | — | 71,981 | 56,784 | — | — | — | — |
| China | — | — | — | — | (¹) 11,548 | (¹) 9,996 | — | — | 12,022 | — |
| Iraq | 192 | 375 | — | — | 1,290 | 6,671 | — | — | — | — |
| Turkey | 35 | 2,434 | 0 | 0 | 16,495 | 19,672 | 62 | 57 | — | — |
| | 0 | 3,984 | — | — | 6,923 | 21,272 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | 55 | 117 | 234 | 494 | 694 | 2,099 | 4,513 | 7,567 | — | — |
| Portugal | 0 | 185 | 68 | 110 | 2,035 | 2,251 | 3,265 | 3,316 | — | — |
| Romania | 0 | 22 | 2,635 | 33 | 0 | 62 | 2,970 | 840 | — | — |
| Yugoslavia | 0 | 26 | 62 | 584 | 0 | 353 | 6,147 | 11,475 | — | — |
| United States | 2 | 0 | 16,100 | 16,709 | 485 | 417 | 312,037 | 209,676 | — | — |
| Mexico | — | — | — | — | (²) 0 | (²) 0 | (²) 3,523 | (²) 3,003 | 139 | 4,835 |
| Butter. — Thousand lb. | | | | | | | | | | |
| | | | | | EIGHT MONTHS (January 1-August 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
| | | | | | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Denmark | 12,566 | 30,091 | — | — | 190,268 | 223,181 | — | — | 330,267 | — |
| Portugal | 18 | 11 | 0 | 0 | 88 | 73 | 0 | 0 | 157 | 0 |
| Romania | 11 | 17 | 0 | 0 | 315 | 500 | 0 | 0 | 935 | 0 |
| United States | 306 | 174 | — | 90 | 1,850 | 1,285 | 811 | 703 | 2,308 | 1,107 |
| Argentina | 877 | 1,519 | 137 | — | 18,991 | 9,978 | — | — | 19,745 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece | — | — | 0 | 51 | — | — | 130 | 741 | — | 1,074 |
| Mexico | — | — | — | — | — | — | (²) 40 | (²) 49 | — | 134 |
| China | — | — | 18 | 42 | — | — | 245 | 419 | — | 593 |
| Iraq | 0 | 0 | 0 | 2 | 0 | 2 | 24 | 31 | 2 | 40 |

(a) Unwashed wool. — (b) Washed wool.

(¹) Up to June 30. — (²) Up to April 30.

| COUNTRIES | AUGUST | | | | RIGHT MONTHS (January 1-August 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|---|----------------------------------|-------|---------|---------|------------------------------------|-------------|-----------|------------------------------------|--------------------------------------|-----------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Cheese. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Portugal. | 15 | 13 | 0 | 31 | 170 | 146 | 29 | 112 | 216 | 201 |
| Romania. | 44 | 7 | 4 | 2 | 300 | 73 | 24 | 37 | 392 | 60 |
| Argentina. | 817 | 324 | — | — | 5,044 | 3,042 | — | — | 5,463 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | 22 | 2 | 9 | 18 | 362 | 62 | 1,398 | 1,942 | 95 | 2,202 |
| United States. | 194 | 146 | 1,378 | 3,435 | 1,327 | 985 | 24,138 | 31,852 | 1,479 | 59,075 |
| Mexico. | ... | ... | ... | ... | 2 (*) | 4 (*) | 306 (*) | 331 | 7 | 882 |
| Iraq. | 0 | 0 | 0 | 2 | 0 | 15 | 24 | 44 | 15 | 62 |
| Cacao. — Thousand lb. | | | | | | | | | | |
| | ELEVEN MONTHS (Oct. 1-August 31) | | | | | | | TWELVE MONTHS (Oct. 1-Sept. 30) | | |
| <i>Exporting Countries:</i> | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Grenada. | ... | ... | — | — | (1) 5,388 | (1) 5,944 | — | — | 7,388 | — |
| Dominican Republic | ... | ... | — | — | (2) 35,406 | (2) 52,060 | — | — | 63,690 | — |
| Trinidad. | ... | ... | — | — | (2) 21,231 | (2) 14,180 | — | — | 17,921 | — |
| Gold Coast. | ... | ... | — | — | (1) 420,707 | (1) 589,399 | — | — | 643,415 | — |
| São Thome and Prince Island. | ... | ... | — | — | (2) 13,752 | (2) 19,410 | — | — | 23,202 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | 0 | 0 | 11 | 161 | 2 | 0 | 1,283 | 3,807 | 0 | 4,101 |
| Portugal. | 0 | 2 | 71 | 44 | 29 | 2 | 1,250 | 1,056 | 2 | 1,215 |
| Romania. | — | — | 55 | 163 | — | — | 2,355 | 3,565 | — | 3,783 |
| United States. | — | — | 79,287 | 52,217 | — | — | 609,781 | 552,480 | — | 583,184 |
| Mexico. | — | — | ... | ... | — | — | (1) 1,986 | (1) 657 | — | 1,345 |
| Tea. — Thousand lb. | | | | | | | | | | |
| | TWO MONTHS (July 1-August 31) | | | | | | | TWELVE MONTHS (July 1-June 30) | | |
| <i>Exporting Countries:</i> | | | | | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |
| China. | 3,953 | 5,664 | 1,020 | 1,795 | 10,582 | 9,232 | 2,674 | 3,283 | 84,492 | 18,576 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | — | — | 15 | 7 | — | — | 18 | 44 | — | 238 |
| Portugal. | — | — | 9 | 31 | — | — | 35 | 51 | — | 384 |
| Romania. | — | — | 4 | 99 | — | — | 55 | 205 | — | 836 |
| United States. | — | — | 7,176 | 7,500 | — | — | 14,491 | 14,297 | — | 100,075 |
| Mexico. | — | — | ... | ... | — | — | ... | ... | (1) 71 | 71 |
| Iraq. | 0 | 0 | 578 | 439 | 0 | 0 | 1,080 | 1,003 | 7 | 6,748 |
| Turkey. | — | — | 51 | 187 | — | — | 201 | 417 | — | 2,357 |
| Coffee. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Costa Rica. | ... | ... | — | — | ... | ... | — | — | (2) 39,813 | — |
| Mexico. | ... | ... | — | — | (1) 1,219 | (1) 985 | — | — | (1) 66,223 | — |
| Nicaragua. | ... | ... | — | — | (1) 14,632 | (1) 4,054 | — | — | 32,662 | — |
| Salvador. | ... | ... | — | — | ... | ... | — | — | 111,962 | — |
| Ecuador. | ... | ... | — | — | ... | ... | — | — | 29,661 | — |
| Venezuela. | ... | ... | — | — | (1) 2,507 | (1) 1,922 | — | — | 47,349 | — |
| Netherlands Indies. | ... | ... | — | — | ... | ... | — | — | (1) 116,568 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Greece. | — | — | 560 | 1,164 | — | — | 1,440 | 2,216 | — | 10,730 |
| Portugal. | 1,027 | 194 | 1,801 | 1,296 | 1,682 | 414 | 3,122 | 2,313 | 3,754 | 18,682 |
| Romania. | — | — | 516 | 500 | — | — | 747 | 1,102 | — | 5,053 |
| Jugoslavia. | — | — | 2,247 | 1,459 | — | — | 4,187 | 2,901 | — | 14,692 |
| United States. | 1,354 | 631 | 151,577 | 139,408 | 1,951 | 1,517 | 336,402 | 278,696 | 12,253 | 2,043,624 |
| Iraq. | 0 | 0 | 137 | 150 | 0 | 0 | 234 | 397 | 0 | 2,776 |
| Turkey. | — | — | 0 | 602 | — | — | 437 | 1,537 | — | 13,334 |

(*) Up to July 31. — (1) Up to June 30. — (2) Up to May 31. — (4) Up to April 30.

STOCKS

Stocks of cereals in farmers' hands in the United States on 1st October.

| PRODUCTS | 1940 | 1939 | 1938 | 1940 | 1939 | 1938 |
|-------------------------------|--------------------------------|------|------|-----------------------|---------|---------|
| | Percentage of total production | | | Stocks in 1,000 cents | | |
| Wheat | 45.4 | 44.9 | 43.1 | 215,848 | 203,195 | 240,847 |
| Oats | 83.0 | 81.4 | 81.1 | 323,539 | 244,271 | 273,383 |
| Maize (old crop) 1) | 23.5 | 24.1 | 15.0 | 310,876 | 311,134 | 197,789 |

1) Data based on maize for grain.

Commercial cereals in store in Canada and the United States.

| PRODUCTS AND LOCATION | Friday or Saturday nearest 1st of month (1) | | | | |
|---|---|----------------|-------------|--------------|--------------|
| | October 1940 | September 1940 | August 1940 | October 1939 | October 1938 |
| | thousand cents | | | | |
| WHEAT: | | | | | |
| Canadian in Canada | ... | 163,422 | 2) 153,682 | 164,905 | 90,399 |
| U. S. in Canada | ... | 374 | ... | 824 | 97 |
| U. S. in the United States | 111,158 | 108,031 | 96,090 | 97,227 | 83,564 |
| Canadian in the United States | 20,401 | 16,696 | 14,147 | 6,886 | 1,096 |
| TOTAL | ... | 288,523 | ... | 269,842 | 175,156 |
| RYE: | | | | | |
| Canadian in Canada | ... | 913 | 2) 1,023 | 1,234 | 1,084 |
| U. S. in Canada | ... | 13 | ... | 13 | 54 |
| U. S. in the United States | 4,765 | 5,120 | 5,061 | 5,494 | 4,346 |
| Canadian in the United States | 1,873 | 1,873 | 1,739 | 794 | 12 |
| TOTAL | ... | 7,919 | ... | 7,535 | 5,496 |
| BARLEY: | | | | | |
| Canadian in Canada | ... | 2,085 | 2) 2,200 | 4,848 | 4,933 |
| U. S. in Canada | ... | 0 | ... | 2 | 324 |
| U. S. in the United States | 5,356 | 4,922 | 2,687 | 9,187 | 8,172 |
| Canadian in the United States | 414 | 566 | 579 | 492 | 25 |
| TOTAL | ... | 7,573 | ... | 14,529 | 13,454 |
| OATS: | | | | | |
| Canadian in Canada | ... | 1,533 | 2) 1,910 | 3,274 | 2,033 |
| U. S. in Canada | ... | 6 | ... | 51 | 406 |
| U. S. in the United States | 2,671 | 2,686 | 886 | 5,149 | 7,048 |
| Canadian in the United States | 176 | 78 | 31 | 7 | 0 |
| TOTAL | ... | 4,303 | ... | 4,481 | 9,487 |
| MAIZE: | | | | | |
| U. S. in Canada | ... | 2,414 | ... | 2,075 | 802 |
| Argentine in Canada | ... | ... | ... | 2 | 34 |
| South African in Canada | ... | ... | ... | 852 | 109 |
| Australian in Canada | ... | ... | ... | 0 | 0 |
| U. S. in the United States | 25,148 | 15,747 | 14,198 | 8,305 | 5,543 |
| TOTAL | ... | ... | ... | 11,234 | 6,488 |

(1) Friday for Canada, Saturday for the United States. — (2) Preliminary data for July 26.

Commercial cereals and oilseeds in store in Argentina.

| PRODUCTS AND LOCATION | First day of month | | | | |
|--------------------------------------|--------------------|-------------|------------|----------------|----------------|
| | September 1940 | August 1940 | July 1940 | September 1939 | September 1938 |
| | thousand centals | | | | |
| Wheat in the ports | 10,856 | 14,736 | 19,685 | (*) | 6,129 |
| Wheat in other positions | 15,067 | 18,711 | 22,991 | (*) | 17,477 |
| TOTAL | (1) 25,923 | (1) 33,447 | (*) 42,676 | (*) | 23,606 |
| Rye | 4,754 | 4,637 | 4,552 | 1,164 | 202 |
| Barley | 4,574 | 4,512 | 4,814 | 1,219 | 627 |
| Oats | 3,224 | 3,239 | 3,415 | 2,857 | 1,003 |
| Maize in the ports | 5,273 | 5,418 | 4,398 | 5,627 | 2,480 |
| Maize in other positions | 10,263 | 6,500 | 6,982 | 9,257 | 7,671 |
| TOTAL | 15,536 | 11,918 | 11,380 | 14,884 | 10,151 |
| Canaryseed | 509 | 497 | 522 | 331 | 262 |
| Linseed in the ports | 3,114 | 3,235 | 3,445 | 2,145 | 2,982 |
| Linseed in other positions | 2,467 | 2,633 | 2,809 | 2,065 | 3,093 |
| TOTAL | 5,581 | 5,868 | 6,254 | 4,210 | 6,075 |
| Sunflowerseed | 2,356 | 2,645 | 2,212 | 1,344 | — |

(1) Including 20,460 thousand centals of the 1939-40 crop. — (*) Including 23,083 thousand centals of 1939-40 crop. —
) Including 26,135 thousand centals of 1939-40 crop. — () Figures for wheat in store have been withheld by governmental order

Cotton stocks on hand in the United States.

| LOCATION | Last day of month | | | | |
|---|-------------------|-------------|-----------|----------------|----------------|
| | September 1940 | August 1940 | July 1940 | September 1939 | September 1938 |
| | thousand centals | | | | |
| In consuming establishments | 3,381 | 3,623 | 4,779 | 4,274 | 5,441 |
| In public storage and at compresses | 52,826 | 44,865 | 44,875 | 69,742 | 64,093 |
| TOTAL | 56,207 | 48,488 | 49,654 | 74,016 | 69,534 |

PRICES BY PRODUCTS.

A) — Spot quotations. ¹⁾

| DESCRIPTION | Oct. 11, 1940 | Oct. 4, 1940 | Sept. 27, 1940 | Sept. 20, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|---|---------------------|--------------------|----------------------|----------------------|------------------|--------------|--------------|-----------------|---------------|
| | | | | | Sept. 1940 | Oct. 1939 | Oct. 1938 | 1939-40 7) | 1938-39 7) |
| Wheat | | | | | | | | | |
| Budapest: Tisza wheat, 78 kg. per hl. (pengő per 100 kg.) | 23.40 | 23.40 | 23.20 | 23.20 | 23.20 | 20.15 | 20.70 | 20.43 | 20.42 |
| Braila: Home-grown, good qual. (lei p. ql.) | 850 | 850 | 750 | 800 | 762 | 440 | 385 | 521 | 411 |
| Winnipeg: No. 1 Manitoba (cents p. 60 lb.) | 85 1/4 | 83 1/4 | 83 | 81 | 80 1/4 | 70 3/4 | 61 1/4 | 76 | 62 |
| Chicago: No. 2 Hard Winter (cents p. 60 lb.) | 85 1/4 | 83 1/4 | 83 | 81 | 80 1/4 | 87 1/4 n. | 68 | 92 1/4 | 70 1/4 |
| Minneapolis (cents per 60 lb.): | | | | | | | | | |
| No. 1 Northern | 81 1/4 | 79 1/4 | 78 1/4 | 76 1/4 | 76 1/4 | 86 1/4 | 71 1/4 | 91 1/4 | 74 1/4 |
| No. 2 Amber Durum | 73 1/4 | 71 1/4 | 70 1/4 | 69 | 69 1/4 | 78 1/4 | 62 1/4 | 80 1/4 | 68 1/4 |
| New York: No. 2 Hard Winter (f.o.b. cents per 60 lb.) | 103 1/4 | 102 1/4 | 100 | 96 1/4 | 96 1/4 | 107 | 85 1/4 | 112 1/4 | 84 1/4 |
| Buenos Aires (a): No. 2 Hard, 80 kg. per hl. (paper pesos per 100 kg.) . . . | ... | ... | ... | ... | ... | 6.30 | 6.64 | 7.66 | 6.89 |
| Rye. | | | | | | | | | |
| Budapest: Pest rye (pengő p. 100 kg.) . | 19.40 | 19.40 | 19.20 | 19.20 | 19.20 | 14.11 | 15.29 | 15.62 | 14.34 |
| Winnipeg: No. 2 rye (cents p. 56 lb.) . | 45 1/4 | 45 | 44 1/4 | 43 | 43 1/4 | 60 1/4 | 41 1/4 | 59 1/4 | 40 1/4 |
| Minneapolis: No. 2 rye (cents p. 56 lb.) | 45 1/4 | 45 | 44 1/4 | 43 | 43 1/4 | 52 | 42 1/4 | 56 1/4 | 44 |
| Barley. | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) | 475 | 475 | 450 | 440 | 422 | 367 | 291 | 399 | 338 |
| Winnipeg: No. 4 West. (cents p. 48 lb.) ^(*) | 44 | 41 | 41 | 44 | 42 1/4 | 39 1/4 | 34 1/4 | 43 | 34 1/4 |
| Chicago: Feeding (on sample; cents p. 48 lb.) | 39 1/4 | 39 1/4 | 39 1/4 | 39 | 39 1/4 | 43 1/4 | 41 1/4 | 45 | 40 1/4 |
| Minneapolis: No. 2 Feeding (cents p. 48 lb.) | 39 1/4 | 39 1/4 | 39 1/4 | 39 | 39 1/4 | 43 1/4 | 41 1/4 | 45 | 40 1/4 |
| Oats. | | | | | | | | | |
| Winnipeg: No. 2 White (cents per 34 lb.) | 33 1/4 | 33 1/4 | 32 1/4 | 32 1/4 | 32 1/4 | 32 1/4 | 28 1/4 | 35 1/4 | 29 |
| Chicago: No. 2 White (cents per 32 lb.) | 33 1/4 | 33 1/4 | 32 1/4 | 32 1/4 | 32 1/4 | 35 1/4 | 27 | 39 | 30 1/4 |
| Buenos Aires (a): No. 2 White, 49 kg. per hl. (paper pesos p. 100 kg.) . . | ... | ... | ... | ... | ... | 5.39 | 5.49 | 5.17 | 4.81 |
| Maize. | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) . | n. q. | n. q. | 545 | 510 | 519 | 292 | 306 | 365 | 362 |
| Chicago: No. 3 Yellow (cents p. 56 lb.) | 64 1/4 | 64 | 62 1/4 | 62 1/4 | 63 1/4 | 49 | 46 1/4 | 53 1/4 | 51 1/4 |
| Buenos Aires (a): Yellow Plata (paper pesos per 100 kg.) | ... | ... | ... | ... | ... | 6.96 | 6.20 | 6.11 | 6.89 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal.
— (a) Thursday prices. — (b) Saturday prices.

(¹) In relation to Government price fixing, numerous series are omitted from this table; notes concerning them have been given in various issues of the Crop Report: France: Sept. 1940, p. 600; Germany: Feb. 1940, p. 142, and July 1940, p. 478; Hungary: Sept. 1940, p. 600; Italy: Dec. 1939, p. 1163, and Sept. 1940, p. 601; Romania: Sept. 1940, p. 601; United Kingdom: Nov. 1939, p. 1060. — (²) Oct. 1939-May 1940: No. 2 Feeding barley; subsequently: Barley N. 3 Western. — (³) Commercial season: August-July for Maize: May-April. — (⁴) Aug. average: 72 1/4. — (⁵) Aug. average: 41 1/4. — (⁶) Aug. average: 30 1/4. — (⁷) Aug. average 29.

| DESCRIPTION | Oct. 11, 1940 | Oct. 4, 1940 | Sept. 27, 1940 | Sept. 20, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|--|-------------------------|--------------------|----------------------|----------------------|------------------|--------------|--------------|---------------------------|---------------------------|
| | | | | | Sept. 1940 | Oct. 1939 | Oct. 1938 | 1939 | 1938 |
| Linseed. | | | | | | | | | |
| Buenos Aires (a): Current quality, 4 % impurities (paper pesos p. 100 kg.). | ... | ... | ... | ... | ... | 16.50 | 13.32 | 15.12 | 14.31 |
| London (c.i.f., shipping current or fol- lowing month; £ per long ton): | | | | | | | | | |
| La Plata | (¹) 10-7-6 | n. q. | 12-0-0 | 12-0-0 | 11-18-1 | n. q. | 10-17-6 | *12- 2-3 | 11-10-11 |
| Bombay | 16-15-0 | 16-15-0 | 16-15-0 | 16-17-6 | 16-15-7 | n. q. | 12-12-3 | *14-10-3 | 13- 3-9 |
| Minneapolis No. 1 Northern (cta. p. 56 lb.). | 146 1/2 | 143 1/2 | 142 | 143 | 145 7/8 | 181 1/2 | 181 1/2 | 180 | 190 |
| | | | | | | | | 1939-40 ²) | 1938-39 ²) |
| Cotton. | | | | | | | | | |
| New Orleans: Middling (cents p. lb.). | 9.39 | 9.55 | 9.57 | 9.50 | 9.53 n. | 8.93 | 8.59 n. | 10.03 | 8.75 |
| New York: Middling (cents per lb.). | 9.75 | 9.94 | 9.91 | 9.89 | 9.89 n. | 9.23 | 8.67 n. | 10.34 | 9.00 |
| Liverpool (pence per lb.): | | | | | | | | | |
| Middling, super good | ... | ... | ... | ... | ... | 6.95 | 5.89 | 8.05 | 5.88 |
| Middling | 7.99 | 8.21 | n. q. | 8.40 | * 8.32 | 6.36 | 5.16 | 7.47 | 5.17 |
| São Paulo, g.f. | ... | ... | ... | ... | ... | 6.42 | 5.17 | 7.44 | 5.14 |
| Broach, good staple, f.g. (¹). | n. 6.21 | n. 6.28 | n. q. | n. 6.28 | * n. 6.20 | n. 5.28 | n. 3.84 | n. 6.36 | * n. 3.92 |
| C.P. Oomra, good staple, superfine (¹). | 6.60 | 6.67 | n. q. | 6.67 | * 6.55 | 5.57 | 3.96 | 6.50 | * 4.11 |
| Giza 7, f.g.f. | 12.94 | 13.16 | n. q. | 13.29 | * 13.33 | 7.54 | 8.22 | 9.58 | 7.22 |
| Upper Egyptian, f.g.f. | 12.25 | 12.48 | n. q. | 12.49 | * 12.56 | 7.18 | 6.56 | 9.32 | 6.00 |

B) — Quotations for future delivery.

| DESCRIPTION | Oct. 11, 1940 | Oct. 4, 1940 | Sept. 27, 1940 | Sept. 20, 1940 | MONTHLY AVERAGES | | | | |
|--|---------------------|--------------------|----------------------|----------------------|------------------|---------------------|--------------|--------------|--------------|
| | | | | | Sept. 1940 | Oct. 1939 | Oct. 1938 | Oct. 1937 | Oct. 1936 |
| Wheat. | | | | | | | | | |
| Winnipeg (cents p. 60 lb.): | | | | | | | | | |
| delivery October | 70 | 70 3/4 | 70 1/4 | 70 | 71 7/8 | 70 3/8 | 60 1/8 | 125 | 110 3/4 |
| " December | 71 1/8 | 71 1/8 | 72 | 71 3/8 | 73 1/8 | 72 | 60 | 119 3/4 | 108 1/8 |
| " May | 75 1/8 | 76 | 76 1/8 | 75 7/8 | 76 | — | 63 3/8 | 118 1/8 | 109 1/8 |
| Chicago (cents p. 60 lb.): | | | | | | | | | |
| delivery September | — | — | — | 77 3/8 | * 75 7/8 | — | — | — | — |
| " December | 84 | 82 1/8 | 80 | 77 3/8 | 77 3/8 | 84 3/8 | 65 1/8 | 100 1/8 | 114 3/8 |
| " May | 82 7/8 | 81 7/8 | 79 3/8 | 78 7/8 | 78 1/8 | 83 3/8 | 66 3/8 | 109 3/8 | 113 3/8 |
| " July | 78 3/8 | 77 7/8 | 76 3/8 | — | — | 81 7/8 | 66 1/8 | 94 3/8 | 98 7/8 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery September | — | — | — | 7.25 | * 7.74 | — | — | — | — |
| " October | 6.10 | 6.10 | 6.65 | 7.22 | 7.45 | — | 6.56 | — | — |
| " November | 6.18 | 6.23 | 6.75 | 7.29 | * 7.37 | 6.36 | 6.40 | 15.56 | 11.19 |
| " December | 6.24 | 6.27 | 6.70 | — | — ²) | 6.66 ²) | 6.82 | 12.63 | — |
| Rye. | | | | | | | | | |
| Winnipeg (cents p. 56 lb.): | | | | | | | | | |
| delivery October | 42 1/4 | 43 1/8 | 43 3/8 | 42 7/8 | 43 3/8 | 60 1/2 | 41 3/8 | 85 3/8 | 69 1/8 |
| " December | 44 | 44 1/2 | 45 3/8 | 44 | 44 1/2 | 57 1/2 | 41 | 84 3/8 | 68 1/8 |
| " May | 47 | 47 1/4 | 47 3/8 | 45 1/8 | 46 1/8 | 58 3/8 | 43 | 86 | 69 3/8 |
| Chicago (cents p. 56 lb.): | | | | | | | | | |
| delivery September | — | — | — | 41 1/4 | * 40 3/8 | — | — | — | — |
| " December | 44 1/4 | 45 1/8 | 44 1/8 | 44 | 43 3/8 | 53 3/8 | 43 | 74 3/8 | 82 3/8 |
| " May | 48 3/8 | 48 3/8 | 48 1/8 | 47 1/8 | 46 7/8 | 54 3/8 | 44 1/2 | 73 3/8 | 80 3/8 |
| " July | 49 | 49 | 49 1/8 | — | — | 54 1/4 | — | — | 73 3/8 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal. — (a) Thursday prices.

(¹) As from March 15, 1939: "fair staple". — (²) Shipping Nov.-Dec. — (³) Commercial season: August-July. — (⁴) February futures.

| DESCRIPTION | Oct. 11, 1940 | Oct. 4, 1940 | Sept. 27, 1940 | Sept. 20, 1940 | MONTHLY AVERAGES | | | | |
|--|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | | | | | Sept. 1940 | Oct. 1939 | Oct. 1938 | Oct. 1937 | Oct. 1936 |
| Barley. | | | | | | | | | |
| Winnipeg (cents p. 48 lb.): | | | | | | | | | |
| delivery October | 38 ⁷ / ₈ | 38 ⁷ / ₈ | 38 ⁷ / ₈ | 34 ⁷ / ₈ | 35 ⁷ / ₈ | 42 ⁷ / ₈ | 36 ⁷ / ₈ | 63 ¹ / ₈ | 61 ¹ / ₈ |
| " December | 38 ⁷ / ₈ | 38 ¹ / ₈ | 38 ¹ / ₈ | 34 ⁷ / ₈ | 35 ¹ / ₈ | 42 ⁷ / ₈ | 35 ¹ / ₈ | 61 ⁷ / ₈ | 59 ⁷ / ₈ |
| " May | 38 ⁷ / ₈ | 39 ⁷ / ₈ | 39 ⁷ / ₈ | 36 ⁷ / ₈ | 36 ⁷ / ₈ | 43 ¹ / ₈ | 36 ⁷ / ₈ | 60 ⁷ / ₈ | 58 ⁷ / ₈ |
| Minneapolis (cents p. 48 lb.): | | | | | | | | | |
| delivery September | ... | ... | ... | ... | ... | — | 33 | — | — |
| " December | ... | ... | ... | ... | ... | 37 ¹ / ₈ | 32 ¹ / ₈ | 46 ¹ / ₈ | 75 ¹ / ₈ |
| Oats. | | | | | | | | | |
| Winnipeg (cents p. 34 lb.): | | | | | | | | | |
| delivery October | 32 ¹ / ₈ | 32 ¹ / ₈ | 30 ⁷ / ₈ | 29 ¹ / ₈ | 30 | 32 ¹ / ₈ | 28 ⁷ / ₈ | 53 ¹ / ₈ | 44 ¹ / ₈ |
| " December | 29 ⁷ / ₈ | 29 ⁷ / ₈ | 28 ⁷ / ₈ | 27 ⁷ / ₈ | 28 ¹ / ₈ | 31 | 27 ⁷ / ₈ | 48 ⁷ / ₈ | 44 |
| " May | 30 | 29 ⁷ / ₈ | 29 ¹ / ₈ | 28 ⁷ / ₈ | 28 ⁷ / ₈ | 31 ¹ / ₈ | 28 ⁷ / ₈ | 47 ¹ / ₈ | 45 |
| Chicago (cents p. 32 lb.): | | | | | | | | | |
| delivery September | — | — | — | 30 ¹ / ₈ | 29 ⁷ / ₈ | — | — | — | — |
| " December | 32 ⁷ / ₈ | 32 ¹ / ₈ | 31 ⁷ / ₈ | 30 | 30 ¹ / ₈ | 34 ¹ / ₈ | 25 ¹ / ₈ | 30 ¹ / ₈ | 41 ⁷ / ₈ |
| " May | 32 ⁷ / ₈ | 32 ¹ / ₈ | 32 ¹ / ₈ | 30 ¹ / ₈ | 30 ¹ / ₈ | 33 ¹ / ₈ | 26 | 30 ⁷ / ₈ | 41 ⁷ / ₈ |
| " July | 30 ⁷ / ₈ | — | — | — | — | 31 ⁷ / ₈ | 25 ¹ / ₈ | 29 ¹ / ₈ | 38 ⁷ / ₈ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery September | — | — | — | 3.95 | 3.98 | 4.78 | — | — | — |
| " October | 3.25 | 3.40 | 3.70 | — | — | — | 5.45 | — | — |
| Maize. | | | | | | | | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | |
| delivery September | — | — | — | 61 ¹ / ₈ | 62 ⁷ / ₈ | — | — | — | — |
| " December | 59 ⁷ / ₈ | 58 ⁷ / ₈ | 57 ⁷ / ₈ | 56 ⁷ / ₈ | 56 ⁷ / ₈ | 49 ⁷ / ₈ | 45 ⁷ / ₈ | 59 ⁷ / ₈ | 94 ⁷ / ₈ |
| " May | 60 ¹ / ₈ | 59 ⁷ / ₈ | 58 ⁷ / ₈ | 57 ⁷ / ₈ | 57 ⁷ / ₈ | 52 ⁷ / ₈ | 48 ⁷ / ₈ | 60 ⁷ / ₈ | 90 ⁷ / ₈ |
| " July | 60 ⁷ / ₈ | 60 ¹ / ₈ | 59 ⁷ / ₈ | — | — | 53 ¹ / ₈ | 50 ¹ / ₈ | 61 ⁷ / ₈ | 86 ⁷ / ₈ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery September | — | — | — | 3.90 | 4.05 | — | — | — | — |
| " October | 3.60 | 3.68 | 3.80 | 4.00 | 4.07 | 7.10 | 6.31 | — | — |
| " November | 3.66 | 3.78 | 3.87 | 4.11 | 3.99 | 7.16 | 6.32 | 7.16 | 6.01 |
| " December | 3.76 | 3.87 | 3.98 | — | — | 7.22 | 6.39 | 7.19 | 6.14 |
| Linseed. | | | | | | | | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery September | — | — | — | 9.60 | 10.05 | — | — | — | — |
| " October | 9.15 | 8.97 | 9.13 | 9.60 | 10.05 | 16.99 | 13.56 | — | — |
| " November | 9.21 | 9.07 | 9.18 | 9.50 | 9.86 | 16.53 | 13.22 | 16.47 | 14.20 |
| Duluth (cents p. 56 lb.): | | | | | | | | | |
| delivery September | ... | ... | ... | ... | ... | — | — | — | — |
| " October | ... | ... | ... | ... | ... | — | 173 | 202 ¹ / ₈ | 202 ¹ / ₈ |
| " December | ... | ... | ... | ... | ... | 174 ¹ / ₈ | 171 ¹ / ₈ | 202 ¹ / ₈ | 203 ¹ / ₈ |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted.

AVERAGE MONTHLY PRICES BY COUNTRIES

| GROUPS | DESCRIPTION | AVERAGE | | | | | | | Agricultural year (*) | |
|--|---|---------|--------|--------|-----------|------------|------------|---------|-----------------------|--|
| | | Sept. | August | July | April- | July- | July- | 1939-40 | 1938-39 | |
| | | 1940 | 1940 | 1940 | June 1940 | Sept. 1939 | Sept. 1938 | | | |
| GERMANY (Prices in Reichsmarks per quintal). | | | | | | | | | | |
| A I | †Wheat (Berlin) | 19.80 | 19.60 | 19.40 | 21.40 | 19.60 | 20.10 | 20.50 | 20.56 | |
| | †Rye (Berlin) | 18.10 | 17.90 | 17.70 | 19.70 | 17.90 | 17.90 | 18.80 | 18.81 | |
| | †Barley, feeding (Berlin) | 16.60 | 16.40 | 16.20 | 17.90 | 16.40 | 16.50 | 17.22 | 17.08 | |
| | †Oats (Berlin) | 17.00 | 16.90 | 17.90 | 17.80 | 17.33 | 16.73 | 17.45 | 17.51 | |
| | †Potatoes, red (Berlin) | 4.66 | 6.86 | 9.68 | 5.30 | 6.68 | 5.10 | 4.90 | 5.02 | |
| | Hops (Nürnberg) | n. q. | 450.00 | 454.00 | 458.00 | 450.00 | 426.00 | 457.60 | 493.45 | |
| A II | †Oxen, live weight (Berlin) | 89.00 | 89.00 | 87.40 | 86.40 | 88.33 | 85.33 | 87.20 | 86.35 | |
| | Calves, live weight (Berlin) | 95.40 | 95.40 | 95.40 | 95.40 | 95.40 | 95.40 | 95.25 | 95.40 | |
| | †Pigs, 220-265 lb., live weight (Berlin) | 108.00 | 110.20 | 111.00 | 104.40 | 105.40 | 105.27 | 104.70 | 101.67 | |
| | Milk, fresh (Berlin) per hectolitre | 19.10 | 19.04 | 19.04 | 19.04 | 16.62 | 15.60 | 17.74 | 16.11 | |
| | †Butter, National Mark | 313.00 | 313.00 | 313.00 | 303.00 | 274.60 | 260.00 | 283.50 | 257.68 | |
| | Creamery butter | 305.00 | 305.00 | 305.00 | 299.00 | 260.00 | 246.00 | 271.83 | 271.69 | |
| | †Cheese, Emmenthal type (Kempten) | ... | ... | ... | 186.75 | 165.00 | 160.00 | 172.13 | 160.00 | |
| | Soft cheese, 20 % butterfat (Kempten) | ... | ... | ... | 65.25 | 58.00 | 58.00 | 60.36 | 58.00 | |
| | †Eggs, aver. size, marked "G.I.B." (Berlin) per 100 | ... | 10.50 | 10.50 | 10.50 | 10.50 | 10.25 | 10.88 | 10.35 | |
| B I | †Basic slag, 16 % (Aachen) (*) | 0.192 | 0.192 | 0.192 | 0.192 | 0.220 | 0.200 | 0.220 | 0.214 | |
| | †Superphosphate of lime, 18 % (*) | 0.314 | 0.314 | 0.303 | 0.309 | 0.310 | 0.310 | 0.309 | 0.309 | |
| | †Potash salts, 40 % (*) | 4.91 | 4.83 | 4.75 | 4.96 | 4.97 | 4.97 | 5.06 | 5.05 | |
| | †Sulphate of ammonia, 21 % (*) | 0.435 | 0.425 | 0.415 | 0.443 | 0.420 | 0.420 | 0.451 | 0.457 | |
| B II | Wheat-bran (Hamburg) | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | 12.25 | |
| | †Linseed cake (Hamburg) | n. q. | n. q. | n. q. | n. q. | 16.25 | 16.30 | 16.25 | 16.25 | |
| | †Coconut cake (Hamburg) | n. q. | n. q. | n. q. | n. q. | 14.65 | 14.70 | 14.65 | 14.65 | |
| | †Groundnut cake (Hamburg) | n. q. | n. q. | n. q. | n. q. | 15.75 | 15.80 | 15.75 | 15.75 | |
| | †Crushed soya extraction residue (Hamburg) | n. q. | n. q. | n. q. | n. q. | 15.45 | 15.50 | 15.45 | 15.45 | |
| DENMARK (Prices in Danish crowns per quintal). | | | | | | | | | | |
| A I | Wheat (Köbenhavn) | 28.00 | 19.00 | 18.90 | 18.70 | 16.33 | 14.83* | 17.98* | 14.34 | |
| | Barley (Köbenhavn) | 25.00 | 18.00 | 17.90 | 17.70 | 13.49 | 13.31* | 16.18 | 12.12 | |
| | Oats (Köbenhavn) | 25.00 | 18.00 | 17.90 | 17.70 | 14.40 | 12.70* | 16.72 | 12.14 | |
| A II | †Cows, live weight (Köbenhavn) | 71.12 | 61.87 | 55.50 | 52.38 | 51.30 | 41.50 | 50.99 | 42.63 | |
| | †Pork, dead weight | 200.00 | 186.00 | 182.00 | 181.78 | 173.47 | 177.60 | 180.23 | 171.27 | |
| | Fresh milk | 20.28 | 18.25 | 17.75 | 16.75 | 14.02 | 14.28 | 15.57 | 14.23 | |
| | †Butter (Köbenhavn) | 357.75 | 324.00 | 324.00 | 262.00 | 229.98 | 230.75 | 252.76 | 237.95 | |
| | Whole milk cheese (Odense) | 218.75 | 187.00 | 170.00 | 155.66 | 132.08 | 140.00 | 152.31 | 137.60 | |
| | †Eggs, for export | 165.00 | 128.00 | 122.00 | 96.58 | 112.37 | 128.50 | 122.33 | 112.26 | |
| B I | †Superphosphate, 18 % | 13.55 | 13.55 | n. q. | n. q. | 6.30 | 6.51 | n. q. | 6.62 | |
| | Potash salts, 40 % | 16.55 | n. q. | n. q. | n. q. | 12.70 | 13.24 | n. q. | 13.49 | |
| | †Sulphate of ammonia, 20.8 % | n. q. | n. q. | n. q. | n. q. | 15.75 | 16.32 | n. q. | 16.57 | |
| | †Nitrate of lime, 15 1/2 % | n. q. | n. q. | n. q. | n. q. | 15.70 | 16.25 | n. q. | 16.52 | |
| B II | Rye, imported (Jutland) | n. q. | n. q. | n. q. | 19.70* | 15.03 | 14.42* | 18.68 | 14.48 | |
| | Maize, Plata (Jutland) | n. q. | n. q. | n. q. | 22.87* | 14.26 | 15.85* | 18.92 | 15.35 | |
| | Wheat-bran, Danish (Köbenhavn) | n. q. | n. q. | n. q. | 18.94* | 10.90 | 13.52* | 15.89 | 11.26 | |
| | Cottonseed cake (Köbenhavn) | n. q. | n. q. | n. q. | 26.26* | 14.66 | 15.25* | 22.57 | 14.66 | |
| | †Sunflower-seed cake (Köbenhavn) | n. q. | n. q. | n. q. | 25.20* | 15.28 | 16.11* | 21.61 | 15.70 | |
| | Groundnut cake (Köbenhavn) | n. q. | n. q. | n. q. | 27.00* | 15.69 | 16.87* | 23.78* | 16.04 | |
| | Crushed soya extraction residue (Köbenhavn) | n. q. | n. q. | n. q. | 26.60* | 16.78 | 16.78* | 23.75 | 16.35 | |

* Indicates that the product was not quoted during part of the period under review. — n. q. = quoted. — n. = nominal.

† Indicates that the series is published in the *International Yearbook of Agricultural Statistics*.

(*) Prices of plant (A I) and animal (A II) products sold by the farmer, also of fertilizer (B I) and concentrated feeding stuffs (B II) bought by the farmer. In cases where the market is not indicated, the price is the average for the whole country. — (†) July to June. — (†) Price per kg of active fertilizer contained in 100 kg of commercial fertilizer. — (†) Free at buyer's station. — (†) Prices for new-crop as from the 16 th of the month. — (†) New crop.

| GROUPS | DESCRIPTION | AVERAGE | | | | | | | Agricultural year | |
|-------------------------------------|--|----------|----------|----------|-----------|------------|------------|----------|-------------------|--|
| | | Sept. | August | July | April- | July- | July- | 1939-40 | 1938-39 | |
| | | 1940 | 1940 | 1940 | June 1940 | Sept. 1939 | Sept. 1938 | | | |
| | | | | | | | | | | |
| ITALY (Prices in lire per quintal). | | | | | | | | | | |
| A I | †Wheat, soft (Milano) | 155.75 | 155.75 | 155.75 | 155.75 | 148.00 | 148.00 | 151.05 | 148.00 | |
| | Wheat, hard (Catania) | 164.75 | 164.75 | 164.75 | 164.75 | 157.00 | 157.00 | 160.05 | 157.00 | |
| | Oats (Milano) | 108.00 | 108.00 | 108.00 | 110.15 | n. q. | 90.00 | 109.15 | 90.00 | |
| | †Maize (Milano) (1) | 283.30 | 283.30 | 283.30 | 281.65 | 254.00 | 246.00 | 270.30 | 249.30 | |
| | Rice, Vialone (Milano) | 217.90 | 217.90 | 217.90 | 216.25 | 199.00 | 189.00 | 207.65 | 193.60 | |
| | Rice, Maratelli (Milano) | 186.80 | 186.80 | 186.80 | 185.15 | 168.95 | 160.50 | 176.80 | 163.45 | |
| | †Rice, Originario (Milano) | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | 590.00 | |
| | †Hemp, fibre (1) | 893.25 | 893.25 | 878.25 | 873.25 | 742.00 | 692.00 | — | 712.00 | |
| | †Olive oil "Soprafino locale" (Bari) | 15.00 | 15.00 | 15.00 | 14.58 | 97.20 | 140.35 | 101.00 | 117.60 | |
| | †Wine, ordinary, 1r* (Bari) per hectolitre (1-4) | 15.00 | 15.00 | 15.00 | 14.58 | 97.20 | 140.35 | 101.00 | 117.60 | |
| A II | †Oxen, live weight, 1st quality (Milano) (1) | 590.00 | 590.00 | 590.00 | 590.00 | 478.15 | 438.65 | 518.25 | 458.30 | |
| | Lambs, dead weight (Roma) (1) | 1,050.00 | n. q. | 950.00 | 890.10 | 885.80 | 817.10 | 838.30 | 725.85 | |
| | Pigs, live weight (Milano) (1-4) | 780.00 | 780.00 | 780.00 | 780.00 | 640.05 | 526.00 | 697.00 | 537.50 | |
| | †Cheese, Parmigiano-Reggiano (Milano) | 1,581.00 | 1,565.70 | 1,550.40 | 1,519.80 | 1,157.50 | 1,156.00 | 1,300.25 | 1,205.75 | |
| | Eggs (Milano) per 100 (1) | 75.90 | 71.00 | 60.85 | 61.30 | 52.05 | 49.75 | 64.40 | 53.20 | |
| | Wool, « Roma 2, viassana » (Roma) (1) | 3,141.00 | 3,141.00 | 3,141.00 | 2,781.65 | 2,602.00 | 2,602.00 | 2,646.90 | 2,602.00 | |
| B I | †Superphosphate of lime, 14-16 % (Milano) | 30.10 | 30.10 | 30.10 | 30.10 | 24.75 | 24.75 | 26.90 | 24.75 | |
| | Chloride of potash, 50 % (Milano) | 82.60 | 82.60 | 82.50 | 82.50 | 71.50 | 71.50 | 76.55 | 71.50 | |
| | †Nitrate of lime, 15-16 % (Milano) | 117.75 | 117.75 | 117.65 | 117.65 | 87.60 | 87.45 | 100.90 | 92.35 | |
| | Sulphate of ammonia, 20-21 % (Milano) | 104.00 | 103.05 | 102.95 | 110.10 | 84.35 | 84.35 | 95.55 | 88.10 | |
| | †Cyanamide of calcium, 15-16 % (Milano) | 112.35 | 111.45 | 111.35 | 118.00 | 90.35 | 90.35 | 102.20 | 70.25 | |
| | †Copper sulphate, 98-99 % (Genova) | n. q. | 234.50 | 233.50 | 231.50 | n. q. | 203.00 | 222.70 | 189.30 | |
| B II | Wheat-bran (Milano) | 62.85 | 62.85 | 62.85 | 62.85 | 60.00 | 60.00 | 61.10 | 60.00 | |
| | Rice-bran (Milano) | 83.00 | 83.00 | 83.00 | 83.00 | 80.00 | 63.00 | 81.20 | 74.35 | |
| | Linseed cake (Milano) (1-4) | 90.00 | 90.00 | 90.00 | 90.00 | 81.00 | 81.00 | 83.25 | 81.00 | |
| | Groundnut cake (Milano) (1-4) | 75.00 | 75.00 | 75.00 | 75.00 | 65.00 | 55.00 | 67.50 | 62.00 | |
| | †Rapeseed cake (Milano) (1-4) | 42.00 | 42.00 | 42.00 | 42.00 | 36.00 | 36.00 | 37.50 | 36.00 | |

NETHERLANDS (Prices in florins per quintal).

| | | | | | | | | | |
|------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| A I | Wheat (1) | ... | ... | ... | 12.45 | 10.63 | 10.20 | 11.74 | 10.05 |
| | Rye (Groningen) (1) | ... | ... | ... | ... | 8.82 | 7.38 | ... | 7.68 |
| | Barley (Groningen) (1) | ... | ... | ... | ... | 8.36 | 6.98 | ... | 7.66 |
| | Oats (Groningen) (1) | ... | ... | ... | ... | 7.44 | 6.07 | ... | 6.45 |
| | Peas (Rotterdam) (1) | n. q. | n. q. | n. q. | n. q. | 12.31 | 10.66 | 11.81 | ... |
| | Flax, fibre (Rotterdam) | n. q. | n. q. | n. q. | n. q. | 70.33 | 65.67 | 85.35 | 71.04 |
| | †Potatoes (Amsterdam) | n. q. | n. q. | n. q. | 4.72 | 4.09 | 4.06 | 4.45 | 4.16 |
| A II | †Beef, dead weight (Rotterdam) | 99.00 | 89.00 | 84.66 | 72.67 | 73.33 | 78.92 | 72.87 | ... |
| | †Pigs, live weight (Rotterdam) | 68.00 | 66.00 | 63.33 | 52.00 | 53.33 | 60.50 | 49.50 | ... |
| | †Butter for export (Leeuwarden) | 80.00 | 80.00 | 80.33 | 73.54 | 77.42 | 78.75 | 77.87 | ... |
| | †Cheese, Edam 40 + (Alkmaar) | ... | ... | ... | 37.10 | 43.04 | 42.08 | 40.06 | ... |
| | Cheese, Gouda 45 + (Gouda) | ... | ... | ... | 51.06 | 50.35 | 51.28 | 50.26 | ... |
| | †Eggs, for export (Roermond) per 100 | 4.10 | 3.68 | 3.45 | 3.37 | 3.82 | 4.01 | 3.76 | ... |
| B I | Basic slag, 16 % (Zwolle) | n. q. | n. q. | 1.93 | 2.22 | 2.03 | 2.26 | 2.19 | ... |
| | Superphosphate, 14 % (Zwolle) | 2.88 | 2.88 | 2.38 | 1.70 | 1.63 | 2.17 | 1.66 | ... |
| | Kainite, 14 % (Zwolle) | 1.66 | 1.65 | 1.61 | 1.60 | 1.60 | 1.64 | 1.63 | ... |
| | Nitrate of soda, 15 1/2 % (Zwolle) | 9.86 | 9.60 | 8.01 | 6.23 | 6.20 | 6.85 | 6.32 | ... |
| | Sulphate of ammonia, 20 % (Zwolle) | 5.90 | 5.90 | 5.85 | 5.35 | 5.31 | 5.54 | 5.47 | ... |
| B II | †Maize (Rotterdam) | 8.35 | 8.25 | 8.31 | 7.62 | 7.95 | 8.14 | 8.00 | ... |
| | †Linseed cake, Dutch (Rotterdam) | n. q. | n. q. | n. q. | 8.26 | 9.14 | 8.51 | 8.65 | ... |
| | †Coconut cake, (Rotterdam) | n. q. | n. q. | n. q. | 7.68 | 8.19 | 7.84 | 7.90 | ... |
| | †Groundnut cake, (Rotterdam) | n. q. | n. q. | n. q. | 8.05 | 8.01 | 8.22 | 7.91 | ... |
| | Crushed soya extraction residue (Zwijndrecht) | n. q. | n. q. | n. q. | 8.00 | 7.77 | 7.82 | 7.94 | 7.81 |

* †: see notes on preceding page.

(1) These prices do not include the tax of 2 per cent on sellings, levied as from Feb. 8, 1940. — (1) As from Jan. 1940: prices per degree and hl. for wine 14° in Barietta. — (1) Prior Feb. 1938, pigs weighing more than 150 kg.; subsequently, pigs of more than 180 kg. — (1) Prices free at factory. — (1) Fixed prices, i.o.r. producing points. — (1) As from September 1939: fixed prices, i.o.r. producing points.

| GROUPS | DESCRIPTION | AVERAGE | | | | | | Agricultural year | |
|---|--|---------|--------|--------|-----------|------------|------------|-------------------|---------|
| | | Sept. | Aug. | July | April- | July- | July- | 1939-40 | 1938-39 |
| | | 1940 | 1940 | 1940 | June 1940 | Sept. 1939 | Sept. 1938 | | |
| SWEDEN (Prices in Swedish crowns per quintal) | | | | | | | | | |
| A I | Wheat (Stockholm) | ... | 24.25 | n. q. | 21.29 | * 16.84 | 17.56* | 19.64* | 17.36 |
| | Rye (Stockholm). | ... | 24.21 | n. q. | 21.34 | * 16.36 | 16.90* | 19.59* | 16.66 |
| | Barley | n. q. | n. q. | n. q. | n. q. | * 13.97 | 14.20* | 16.50* | 13.44 |
| | Oats (Stockholm) | n. q. | n. q. | n. q. | n. q. | n. q. | 12.75* | 16.17* | 11.40 |
| A II | Cows, live weight (Stockholm) | ... | 72.00 | 72.00 | 75.67 | 71.00 | 63.33 | 72.33 | 63.17 |
| | Pigs, live weight (Göteborg) | ... | 123.00 | 120.00 | 109.00 | 102.00 | 101.00 | 104.83 | 102.58 |
| | Butter (Malmö; prices for the home market) | 325.00 | 325.00 | 325.00 | 300.00 | 300.00 | 265.00 | 300.00 | 271.08 |
| | Eggs (Stockholm) | 189.00 | 148.75 | 136.25 | 133.00 | 134.17 | 137.83 | 150.46 | 135.92 |
| B I | Superphosphate, 20 % | 9.80 | 9.80 | 9.80 | 9.80 | 7.20 | 7.20 | 8.62 | 7.25 |
| | Potash salts, 40 % | 15.60 | 15.60 | 15.60 | 15.60 | 12.10 | 12.10 | 14.62 | 12.32 |
| | Nitrate of soda, 15 1/2 % - 16 % | ... | ... | ... | 18.90 | 17.25 | 17.65 | 18.07 | 17.45 |
| | Nitrate cyanamide, 15 1/2 % | 17.05 | 17.05 | 17.05 | 17.05 | 16.55 | 16.95 | 16.81 | 16.75 |
| B II | Maize, Plata. | n. q. | 18.50 | 18.50 | 18.50 | 18.45 | 16.03* | 18.68 | 17.43 |
| | Wheat-bran | 16.50 | 17.50 | 17.50 | 17.41 | 13.04 | 13.84 | 15.63 | 12.98 |
| | Groundnut cake | n. q. | n. q. | n. q. | 24.50 | 21.37 | 19.68 | 23.72 | 20.14 |
| | Cottonseed cake | n. q. | n. q. | n. q. | 23.00 | 20.99 | 19.08 | 22.50 | 19.53 |
| | Soya meal | n. q. | n. q. | n. q. | 23.00 | 22.09 | 19.70 | 22.77 | 20.35 |

LATEST INFORMATION**VEGETAL PRODUCTION.**

Hungary. — On October 29, the Hungarian Government wired the Institute the latest estimate on the production of cereals, potatoes and sugar beets. These data, as well as those communicated before, have reference to the present Hungarian territory without northern Transylvania.

| | | Forecast at 26th October 1940 | Forecast at 5th October 1940 |
|-----------------------|----------------------------|--|---------------------------------------|
| Wheat | 1,000 centals | 45.581 | 45.748 |
| | 1,000 bushels of 60 lb. | 75.966 | 76.246 |
| Rye | 1,000 centals | 15.964 | 16.169 |
| | 1,000 bushels of 56 lb. | 28,507 | 28,873 |
| Barley | 1,000 centals | 15,280 | 15,305 |
| | 1,000 bushels of 48 lb. | 31,834 | 31,885 |
| Oats | 1,000 centals | 9,575 | 9,495 |
| | 1,000 bushels of 32 lb. | 29,921 | 29,673 |
| Maize | 1,000 centals | 65,345 | 62,252 |
| | 1,000 bushels of 56 lb. | 116,688 | 111,164 |
| Potatoes | 1,000 centals | 75,870 | 73,884 |
| | 1,000 bushels of 60 lb. | 126,448 | 123,138 |
| Sugar-beets | 1,000 centals | 38,762 | 39,090 |
| | 1,000 short tons | 1,938 | 1,954 |

Rectifications are not of great importance, except in the case of maize and potatoes, for which the estimate of October 26, 1940 shows considerable increases as compared with the estimate of October 5 of the same year.

Uruguay. — In the following table the preliminary estimates are given on the surfaces sown to cereals and flax in 1940-41, as compared with the final figures of the last season and of the average of the preceding five years.

| | <i>Area sown.</i> (1,000 acres) | | | % 1940-41 | |
|-------------------|------------------------------------|---------|----------------------------|------------------|------------------|
| | 1940-41 | 1939-40 | Average 1934-35/1938-39 | 1939-40 = 100 | Average = 100 |
| Wheat | 844 | 1,165 | 1,215 | 72.5 | 69.5 |
| Oats | 227 | 215 | 209 | 105.8 | 108.7 |
| Barley | 58 | 45 | (31) | 127.6 | — |
| Linseed | 460 | 584 | 370 | 78.7 | 124.1 |

The diminution on the surfaces sown to wheat and flax as compared with the preceding season (as regards wheat the diminution is noticeable also as compared with the average) was caused by very rainy weather which retarded and considerably hindered sowings.

Towards the middle of October the general condition of the crops was considered rather satisfactory in the country taken as a whole.

TRADE.

Exportations from Uruguay.

The figures given below indicate the exportations from Uruguay during the month of August 1940. The figures in brackets indicate the corresponding data for the year 1939: Wheat 0 (115) thousand centals; Wheat flour 0 (24) thousand centals; Linseed 25 (198) thousand centals; Unwashed wool 3,532 (6,636) thousand lb.; Washed wool 408 (1,997) thousand lb.

Data for trade campaigns are as follow: Wheat, August 1-July 31, 1,394 (2,413) thousand centals; Wheat flour 237 (408) thousand centals; Linseed, January 1-August 31, 1,463 (2,085) thousand centals; Wool, September 1-August 31, Unwashed wool 70,916 (95,932) thousand lb; Washed wool 24,617 (24,306) thousand lb.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

The following explanations refer to crop conditions quoted in the crop notes and in the tables. — Crop condition according to the system of the country: Germany, including Ostmark and Sudetenland, Bohemia and Moravia (Protectorate); Hungary and Luxemburg: 1 = excellent, 2 = good, 3 = average, 4 = poor, 5 = very poor; Finland: 8 = very good, 6 = above the average, 5 = average; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = poor; Estonia, Latvia, Lithuania, Poland, Rumania and Sweden: 5 = excellent, 4 = good, 3 = average, 2 = poor, 1 = very poor; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; Portugal: 100 = excellent, 80 = good, 60 = average, 40 = poor, 20 = very poor; Switzerland: 100 = excellent, 90 = very good, 75 = good, 60 = fairly good, 50 = average, 40 = rather poor, 30 = poor, 10 = very poor; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = poor; Canada: 100 = crop condition promising a yield equivalent to the average yield of a long series of years; United States: 100 = crop condition which promises a normal yield; Egypt: 100 = crop condition which promises a yield equal to the average yield of the last five years. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

NOTE: The countries are listed throughout by continents (Europe, followed by the U. S. S. R., America, Asia, Africa and Oceania) in the French alphabetical order. In the tables the Northern Hemisphere precedes the Southern Hemisphere.

VEGETAL PRODUCTION

WORLD WHEAT PRODUCTION IN 1940.

The Institute published last month the preliminary estimates on the probable results of the 1940 wheat production in the different continents. These estimates were based on whatever official information the Institute could gather. Lapses were filled with approximate estimates calculated conjecturally on the basis of other available information from various sources. In the course of this month the Institute received some additional data and some supplementary information, which have made it possible to partially revise previous calculations and estimates.

Among the European countries, only Norway has communicated a first estimate on its wheat production; which, although it had much increased during these last years, has remained considerably below 3 million bushels. The 1940 crop is estimated at about 2.6 million bushels as against 2.9 millions in 1939, and an average of 2.1 millions in the five preceding years. This production is very satisfactory, it being only 10 per cent. lower than the maximum registered last year, and by one fourth higher than the previous average. Sweden, a country so very near to Norway, registered this year a production which is only one half that of 1939, and about two thirds of the average. While this comparison shows that production was very irregular even in countries adjoining each other, it is also confirmed that the production in the great majority of the Eu-

ropean countries was either decidedly poor or hardly mediocre. Some of the Institute's conjectural estimates had to be revised, because they appeared a little too high. Consequently the estimate on the total European production, which last month had been calculated to amount to 1,415 million bushels, was reduced to 1,396 millions.

In North America, the second estimate on the Canadian crop published in November, shows a slight decrease as compared with the forecast made in September. This is an almost general rule, that was confirmed this year also. The November estimate shows a decrease of from 561 to 547 million bushels *i. e.*, 2,5 per cent. In spite of this decrease, the Canadian production is very high: the highest, in fact, ever registered in that country, with the exception of the absolute maximum attained in 1928 with 567 million bushels. The final estimate, which is generally very near to that given in November (very often with a slight increase, as is shown in the table below) will be published next January.

Estimates of the Canadian Wheat Crops.

| Year | (Million bushels) | | |
|----------------|--------------------|-------------------|---------------|
| | September Estimate | November Estimate | Final Results |
| 1931 | 271 | 298 | 321 |
| 1932 | 467 | 431 | 443 |
| 1933 | 283 | 272 | 282 |
| 1934 | 277 | 275 | 276 |
| 1935 | 291 | 274 | 282 |
| 1936 | 233 | 233 | 219 |
| 1937 | 188 | 183 | 180 |
| 1938 | 358 | 348 | 360 |
| 1939 | 449 | 479 1) | 490 |
| 1940 | 561 | 547 | ... |

1) Subject to revision next January.

This high production in Canada in 1940, following the very high one in 1939, is going to create a serious problem not only as regards the disposal of surpluses but also as regards storage and the conservation of the wheat. The present storage capacity of the Canadian elevators is estimated at 382 million bushels (after deducting 10 per cent for working space). Taking into account temporary facilities for handling 30 million bushels, it may reach 412 millions. By using besides the storage capacity of 48 millions bushels in United States terminal elevators, the total available capacity may reach 460 million bushels. At August 1, 1940, the stocks of Canadian wheat from the 1939 crop, already in store in Canada and in the United States, amounted to 295 million bushels, so that for the 547 million bushels of wheat of the new crop, the space for only 165 million bushels was available. This congestion will be lightened as wheat is exported and consumed, but the situation has been serious in the months of Autumn, and important quantities had to be held on the farms by growers, who naturally do not dispose of such rational equipment as can guarantee a long conservation of the product.

The October estimate on the production in the United States will be revised in December, when final data will be available. The modification in the estimate of the Canadian production affects the total estimate made last month for North America: a decrease of 14 million bushels is registered.

Among the Asiatic countries, Turkey has published a revised estimate on the wheat production, which shows an increase from 170 to 191 million bushels. If this figure is confirmed, the 1940 production is higher than any previous maximum, because it is 12 per cent above the record registered last year and 53 per cent. above the average. Thus there would be a large surplus available for exportation, which would find a ready market in continental Europe, the surpluses available for exports from the Danubian countries being very low.

In Japan, the wheat production, which from preliminary information was estimated nearly as high as the maximum registered last year, appears now exceptionally good, showing an increase of 8 per cent. above the record figure registered in 1939. The policy vigorously pursued during these last years by the Japanese Government in favour of an increase in the wheat production, has been rewarded by a brilliant success, because it obtained a marked increase in the unit yields on very enlarged areas.

Area and Production of Wheat in Japan.

| | Area (ooo acres) | Production (million bushels) | Yield (bushels per acre) |
|-----------------------------|---------------------|---------------------------------|-----------------------------|
| Average 1923-1927 | 1,160 | 28.8 | 24.8 |
| „ 1928-1932 | 1,220 | 32.0 | 26.3 |
| „ 1933-1937 | 1,640 | 46.5 | 28.4 |
| Year 1938 | 1,780 | 45.2 | 25.5 |
| „ 1939 | 1,820 | 61.1 | 33.5 |
| „ 1940 | 2,060 | 66.1 | 32.5 |

In Mandchoukuo, on the contrary, the first estimate made in August, shows a poor production, 7 per cent lower than that of last year, which had been nearly the same as the low average for the five preceding years. Following these modifications, the total production in Asia (excepting China, Irak and Iran) shows an increase of about 25 million bushels, i. e., from 705 millions according to the estimate last month, to 730 millions.

No other important modification is to be registered in the estimates for the other countries of the northern hemisphere.

As regards the producing countries of the southern hemisphere where wheat is now about to be harvested, the latest information received from Argentina indicate that the condition of the crop (which at the beginning of its vegetative cycle had caused some preoccupation on account of damages done by excessive rains in June and July, and had improved with the coming of dry and cold weather in the second half of August and in September) made good progress during the month of October; so that at the beginning of November it was satisfactory nearly everywhere, and in some places it was even excellent. The last telegraphic communication by the Argentine Government, dated November 21, con-

firmly that the area sown to wheat is practically the same as last year, with only a very small decrease. While waiting for the first official estimate on the production which will be published next month, and taking into account also the rather poor crop prospects in Uruguay, it seems hardly necessary to modify the preliminary estimate made last month on the probable amount of the production in South America. Therefore no variation is made in the figure of 276 million bushels given in October. If necessary, a modification will be made when more exact information reaches the Institute.

Official information from Australia is entirely lacking, and the data which the Institute possesses are rather old and incomplete. The condition of the crops appears quite different from one region to another, according to the distribution of the rainfall in October, which was extremely irregular. The impression however is that the condition of the crop, which is now about ripe, has slightly improved as compared with the forecast last month; so that the total production in Oceania, including New Zealand, should amount to about 140 million bushels instead of 132 millions as indicated in October.

WHEAT. — *World Production by Continents.*

(in million bushels).

| PERIOD | North & Cent. America | South America | Europe (1) | Asia (2) | Africa | Oceania | Total (2) | U. S. S. R. |
|---------------------------|-----------------------------|------------------|---------------|-------------|--------|---------|--------------|-------------|
| Averages: | | | | | | | | |
| 1909-13 | 900 | 180 | 1,360 | 490 | 102 | 98 | 3,130 | 757 |
| 1923-27 | 1,210 | 278 | 1,244 | 497 | 108 | 143 | 3,480 | 677 |
| 1928-32 | 1,288 | 290 | 1,429 | 536 | 128 | 189 | 3,860 | 797 |
| 1933-37 | 901 | 280 | 1,580 | 580 | 133 | 166 | 3,640 | 1,206 |
| Year: | | | | | | | | |
| 1938 | 1,304 | 400 | 1,822 | 680 | 140 | 162 | 4,508 | 1,494 |
| 1939 | 1,260 | 176 | 1,705 | 694 | 169 | 220 | 4,224 | ... |
| 1940 (forecast) | 1,353 | 276 | 1,396 | 730 | 147 | 140 | 4,042 | ... |

(1) Excluding the U. S. S. R. — (2) Excluding U. S. S. R., China, Iraq and Iran.

On the whole, the estimates and the information received by the Institute in the month of November modify but very slightly the forecasts published last month. Differences from these modifications affecting the totals of some continents, compensate each others and the total of the world production remains practically as forecast.

* * *

Not much information is available regarding the conditions under which the work in the fields for preparation of the land and for sowing in the present season was carried on. In general, great efforts have been made in every European country to increase the winter culture of bread cereals, in order to insure the necessary foodstuff through home resources. The rather dry weather

prevailing at the beginning of Autumn has retarded in many countries the work in the fields; but frequent rains followed, and the work has been carried on under favourable conditions nearly everywhere. Fine weather has helped the gathering of root plants which has been completed without any delay. In some countries there have been some complaints over the shortage of labour hands, owing to military mobilisation; but nearly everywhere attempts have been made to make up for this inconvenience. In some countries the rains were somewhat excessive. On the whole the general impression is that, contrary to what happened during the last world war when the agricultural factor was neglected, this time all responsible authorities have taken timely steps in order to insure from their respective countries the maximum of foodstuffs and prime materials required for home needs. Up to the present, the season has been rather favourable, and there is good reason to believe that on the whole the condition of sowings in the majority of the European countries is satisfactory.

In the U. S. S. R. the weather was favourable for seeding and the germination took place very quickly. In the United States, the work in the fields, sowings and germination were favoured by very good weather in all the winter wheat belt. This was especially the case in the western regions, where plants were already sprouted and appeared to be developing very satisfactorily.

CURRENT INFORMATION FROM VARIOUS COUNTRIES ON WHEAT, RYE, BARLEY AND OATS.

Germany: According to press reports the area sown to winter rye and winter wheat is respectively 3 per cent. and 10 per cent. larger than last year. By the middle of November plowing and sowing operations were terminated. The condition of seeds is good.

Belgium: It is believed that, after the decision of the Ministry of Agriculture, the area sown to bread-making cereals will be considerably large. In fact, the wheat area will be increased from 445,000 acres to 618,000 acres, and the area sown to rye, from 346,000 to 395,000 acres. This increase of areas sown to cereals will be compensated by a decrease of the areas of some forage cultures.

Finland: Following a period of rather mild weather at the beginning of the month of October, the temperature fell below normal in the last two weeks of that month. Rains were scarce. Preparatory works for the sowings of autumn cereals took place under average conditions.

According to the most recent estimate production of meslin this year for Finland within the present frontiers is about 355,000 centals (612,000 bushels) against 425,000 (733,000) in 1939; percentage 83.5.

Hungary: During the three weeks, October 27 November 16, the weather was mostly rainy and cold. Sowings of winter cereals were much retarded in some regions. Owing to the delay in the gathering of sugar beets and potatoes and the harvest of maize, plowing of the land was also delayed. In many places the land is flooded. Early sowings of winter cereals germinated well, the plants are healthy and are developing well; late sowings due to cold and rainy weather, on the contrary, are grow-

ing very irregularly. By November 16, rye and winter barley had been sown nearly everywhere. At the middle of November, the area sown to winter wheat in many departments was only from 60 to 80 per cent. the total which it is proposed to leave to that crop. In a great many places the seeds are covered by the flood.

Areas under cereals.

| COUNTRIES | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | |
|---|-----------|-----------|----------------------------|---------------|------------------|-----------|-----------|----------------------------|---------------|------------------|--|
| | | | | 1939 = 100 | Average = 100 | | | | 1939 = 100 | Average = 100 | |
| | ooo acres | | | | | ooo acres | | | | | |
| WHEAT | | | | | | | | | | | |
| Finland | (1) 303 | (1) 336 | (2) 222 | 90.1 | — | (1) 490 | (1) 539 | (2) 592 | 91.1 | — | |
| Greece | 2,599 | 2,356 | 2,072 | 110.3 | 125.4 | 163 | 156 | 170 | 104.6 | 96.2 | |
| Hungary | (4) 4,313 | (4) 4,626 | (5) 3,926 | — | — | (3) 1,624 | (4) 1,718 | (5) 1,558 | — | — | |
| Luxembourg ^w | 35 | 38 | 45 | 91.1 | 76.2 | 16 | 18 | 18 | 89.8 | 89.2 | |
| Romania | (6) 4,564 | 10,079 | 8,560 | — | — | (6) 426 | 1,107 | 1,037 | — | — | |
| Sweden | 764 | 828 | 716 | 92.2 | 106.6 | 426 | 463 | 539 | 92.0 | 78.9 | |
| Yugoslavia | * 4,695 | 5,585 | 5,392 | 84.1 | 87.1 | — | — | — | — | — | |
| U. S. S. R.: Lithuania . . | (1) 498 | (1) 512 | (2) 512 | 97.1 | — | (1) 1,428 | (1) 1,410 | (2) 1,255 | 101.3 | — | |
| Canada { ^w 775 735 590 105.5 131.4 786 891 565 88.2 139.2 | | | | | | | | | | | |
| United States { ^s 27,951 26,021 24,451 107.4 114.3 249 211 168 118.0 147.9 | | | | | | | | | | | |
| India | 34,922 | 37,802 | 40,498 | 92.4 | 86.2 | 3,086 | 3,811 | 3,363 | 81.0 | 91.8 | |
| Japan | 17,758 | 15,894 | 15,058 | 111.7 | 117.9 | — | — | — | — | — | |
| Manchukuo | 33,666 | 34,941 | 34,585 | 96.4 | 97.3 | — | — | — | — | — | |
| Egypt | 2,064 | 1,823 | 1,691 | 113.2 | 122.0 | — | — | — | — | — | |
| Argentina (7) | 2,518 | 3,188 | 2,677 | 79.0 | 94.1 | — | — | — | — | — | |
| U. S. S. R.: Lithuania . . | 1,563 | 1,501 | 1,452 | 104.1 | 107.6 | — | — | — | — | — | |
| Argentina (7) | 17,569 | 17,833 | 18,473 | 98.5 | 95.1 | 2,751 | 2,296 | 2,105 | 119.8 | 130.7 | |
| BARLEY | | | | | | | | | | | |
| Finland | (1) 281 | (1) 294 | (2) 311 | 95.6 | — | (1) 1,066 | (1) 1,166 | (2) 1,143 | 91.3 | — | |
| Greece | 554 | 532 | 511 | 104.2 | 108.6 | 434 | 373 | 339 | 116.3 | 128.0 | |
| Hungary | (3) 1,300 | (4) 1,321 | (5) 1,135 | — | — | (3) 793 | (4) 633 | (5) 542 | — | — | |
| Romania | (6) 1,604 | 2,708 | 3,857 | — | — | (4) 1,406 | 1,455 | 1,910 | — | — | |
| Sweden | 264 | 280 | 258 | 94.6 | 102.3 | 1,574 | 1,647 | 1,647 | 95.6 | 95.6 | |
| U. S. S. R.: Lithuania . . | (1) 558 | (1) 550 | (2) 521 | 101.6 | — | (1) 944 | (1) 941 | (2) 858 | 100.4 | — | |
| Canada | 4,342 | 4,347 | 4,144 | 99.9 | 104.8 | 12,298 | 12,790 | 13,435 | 96.2 | 91.5 | |
| United States | 13,290 | 12,600 | 9,555 | 105.5 | 139.1 | 34,585 | 33,070 | 34,715 | 104.6 | 99.6 | |
| Japan | 1,848 | 1,879 | 1,887 | 98.3 | 97.9 | — | — | — | — | — | |
| Egypt | 278 | 273 | 280 | 101.9 | 99.2 | — | — | — | — | — | |
| Argentina (7) | 2,139 | 2,122 | 1,975 | 100.8 | 108.3 | 3,899 | 3,446 | 3,251 | 113.1 | 119.9 | |
| OATS | | | | | | | | | | | |

^w) Winter crops. — ^s) Spring crops. — * Unofficial approximate estimate. — (1) Present territory. — (2) Former territory. — (3) Including the reannexed northern zone and Sub-Carpathia. — (4) Including the reannexed northern zone but excluding Sub-Carpathia. — (5) Territory as at the end of 1937. — (6) Not including Bessarabia and Northern Bucovina. — (7) Areas sown for the 1940-41 crop.

Luxembourg: The production of bread making cereals in 1940 is estimated at 902,000 centals (45,000 short tons) as against 891,000 centals (44,500 short tons) in 1939, and an average of 1,095,000 centals (55,000 short tons) in the five preceding years: percentages, 101.2 and 82.3.

Norway: According to the most recent estimate the production of meslin this year is about 223,000 centals (384,000 bushels) against 263,000 (453,000) in 1939 and 215,000 (370,000) on the average of the five years ending in 1938; percentages 84.8 and 103.7.

Romania: Up to the middle of October a severe drought prevailed over nearly the whole country. In some places the soil was so hard that it could not be worked even with tractors. Owing to the advanced season, the problem of the sowing of winter cereals caused the most serious preoccupations in the whole country. The Government took all the necessary measures to take the best advantage of the days which would allow plowing and sowing. Agricultural authorities have prepared at the proper time the quantities of winter wheat seeds necessary for sowing, and have distributed them to the farmers. Up to the 20th October, the area sown to winter wheat was only a very small part of the whole which had been proposed to devote to that crop. Fortunately during the last ten days in October and the first half of November there have been some heavy rains and the weather has been more or less favourable to sowing. Toward November 3, the area sown to winter wheat amounted to about 2,470,000 acres, *i. e.*, one third of the area which it was intended to devote this year to that crop. About the middle of November sowings had been extended to over nearly two thirds of that area. The 7,400,000 acres which it is proposed to devote to winter wheat this year represent a very great increase, not only in proportion to the very small one of 1939/40, but also to the average of the five preceding years. In view of the plowing and sowing campaign in the Spring of 1941, the Government has already taken some measures, of which the most important are the purchase of 1000 tractors from Germany, and the training of the drivers for them.

Yugoslavia: During the first half of October the weather was cloudy and often rainy, but not very cold in the northeastern regions, while in the south it was fair and rather warm. In the third week of the month the temperature lowered considerably all over the country. In the northern and mountainous regions the temperature fell to -8° , while in the southern regions it was not above $+20^{\circ}$. During the same period the weather was generally fair, except in the mornings, when, after the nightfrosts, it was quite foggy. In the last week of the month the weather was rainy, but not so cold. At the end of the month the first snow fell in the northwestern regions. Sowings of winter cereals were completed under favourable conditions.

U. S. S. R.: According to official information, this season's total yield of cereals and leguminous plants (beans, kidney beans, lentils etc.) amounts to about 2,535,324 thousand centals (126,764,500 short tons) as against 2,314,861 thousand centals (115,741,500 short tons) in 1939 and an average 2,105,466 thousand centals (105,271,855 short tons) in the course of the five preceding years. Thus the 1940 production would be over 9.5 per cent. above that of last year, and 20 per cent. above the average of the five preceding years. Considering that weather conditions were not always favourable to cereal crops, the good yields of the 1940 harvest must be attributed mostly to the remarkable improvements of cultural methods in the U. S. S. R. in these last years. For comparison purposes, it is worth remarking that in 1937 the total production of cereals and grain leguminous plants in the Soviet Union was 2,649,965 thousand centals (132,946,460 short tons), *i. e.*, only slightly above that of 1940, and the total production of the principal cereals (wheat, rye, barley, and oats) represented about 90 per cent. of that figure. In the following table are shown areas, production and unit yields of the principal cereals in 1937.

Cereal Production.

| COUNTRIES AND PRODUCTS | 1940 | | | 1939 | | | Average 1934 to 1938 | | | 1940 | | | 1939 | | | Average 1934 to 1938 | | | % 1940 | |
|----------------------------|----------------|---------|-----|---------|-----|---------|----------------------------|---------|-----|------------------|-----|---------|-------|--|-------|----------------------------|--|--|---------------|------------------|
| | Thousand cents | | | | | | | | | Thousand bushels | | | | | | | | | 1939 = 100 | Average = 100 |
| WHEAT | | | | | | | | | | | | | | | | | | | | |
| Spain | * | 72,753 | | 63,447 | (1) | 93,264 | * | 121,252 | | 105,742 | (1) | 155,437 | 114.7 | | 78.0 | | | | | |
| Finland | (2) | 3,594 | (2) | 5,102 | (3) | 3,581 | (2) | 5,989 | (2) | 8,503 | (3) | 5,968 | 70.4 | | — | | | | | |
| Greece | | 20,503 | | 22,975 | | 16,616 | | 34,171 | | 38,291 | | 27,693 | 89.2 | | 123.4 | | | | | |
| Hungary | (4) | 45,748 | (5) | 67,862 | (6) | 48,933 | (2) | 71,246 | (5) | 113,102 | (6) | 81,554 | — | | — | | | | | |
| Italy | | 160,938 | | 175,929 | | 160,487 | | 268,225 | | 293,210 | | 267,474 | 91.5 | | 100.3 | | | | | |
| Norway | | 1,558 | | 1,716 | | 1,236 | | 2,597 | | 2,860 | | 2,060 | 90.8 | | 126.1 | | | | | |
| Romania | (7) | 36,402 | | 98,169 | | 74,044 | (7) | 60,669 | | 163,611 | | 123,404 | — | | — | | | | | |
| Slovakia | | 7,527 | | 8,400 | | — | | 12,546 | | 13,999 | | — | 89.6 | | — | | | | | |
| Sweden | | 10,020 | | 18,831 | | 15,475 | | 16,700 | | 31,384 | | 25,791 | 53.2 | | 64.8 | | | | | |
| Yugoslavia | * | 43,652 | | 63,397 | | 53,571 | * | 72,751 | | 105,659 | | 89,283 | 68.9 | | 81.5 | | | | | |
| U.S.S.R.:Estonia | | 1,676 | | 1,880 | | 1,648 | | 2,792 | | 3,133 | | 2,746 | 89.1 | | 101.7 | | | | | |
| Canada | f(w) | 13,678 | | 13,363 | | 8,437 | | 22,797 | | 22,271 | | 14,061 | 102.4 | | 162.1 | | | | | |
| United States | f(w) | 314,629 | | 280,411 | | 149,630 | | 524,382 | | 467,352 | | 249,383 | 112.2 | | 210.3 | | | | | |
| Mexico | f(w) | 333,503 | | 338,059 | | 335,654 | | 555,839 | | 563,431 | | 559,423 | 98.7 | | 99.4 | | | | | |
| | (s) | 141,896 | | 114,924 | | 94,772 | | 236,492 | | 191,540 | | 157,954 | 123.5 | | 149.7 | | | | | |
| | | 7,740 | | 8,863 | | 6,932 | | 12,900 | | 14,771 | | 11,553 | 87.3 | | 111.7 | | | | | |
| India (8) | | 239,098 | | 220,013 | | 219,475 | | 398,496 | | 366,688 | | 365,792 | 108.7 | | 108.9 | | | | | |
| Japan | | 39,682 | | 36,652 | | 28,467 | | 66,135 | | 61,086 | | 47,445 | 108.3 | | 139.4 | | | | | |
| Manchukuo | | 19,354 | | 20,852 | | 20,816 | | 32,257 | | 34,753 | | 34,693 | 92.8 | | 93.0 | | | | | |
| Turkey | | 114,641 | | 101,587 | | 75,101 | | 191,064 | | 169,309 | | 125,165 | 112.8 | | 152.6 | | | | | |
| Egypt | | 29,885 | | 29,406 | | 26,102 | | 49,807 | | 49,009 | | 43,502 | 101.6 | | 114.5 | | | | | |
| RYE | | | | | | | | | | | | | | | | | | | | |
| Spain | * | 15,432 | | 9,045 | (1) | 10,981 | * | 27,558 | | 16,152 | (1) | 19,608 | 170.6 | | 140.5 | | | | | |
| Finland | (2) | 5,930 | (2) | 6,736 | (3) | 8,168 | (2) | 10,590 | (2) | 12,029 | (3) | 14,586 | 88.0 | | — | | | | | |
| Greece | | 1,275 | | 1,376 | | 1,248 | | 2,278 | | 2,457 | | 2,229 | 92.7 | | 102.2 | | | | | |
| Hungary | (4) | 16,169 | (5) | 19,042 | (6) | 15,361 | (4) | 28,873 | (5) | 34,004 | (6) | 27,430 | — | | — | | | | | |
| Norway | | 126 | | 136 | | 244 | | 224 | | 242 | | 436 | 92.6 | | 51.5 | | | | | |
| Romania | (7) | 3,803 | | 9,513 | | 8,625 | (5) | 6,791 | | 16,987 | | 15,401 | — | | — | | | | | |
| Slovakia | | 4,991 | | 4,894 | | — | | 8,912 | | 8,740 | | — | 102.0 | | — | | | | | |
| Sweden | | 6,528 | | 8,340 | | 9,327 | | 11,657 | | 14,894 | | 16,655 | 78.3 | | 70.0 | | | | | |
| U.S.S.R.:Estonia | | 4,211 | | 5,019 | | 4,216 | | 7,519 | | 8,963 | | 7,528 | 83.9 | | 99.9 | | | | | |
| Canada | f(w) | 5,912 | | 6,820 | | 3,065 | | 10,557 | | 12,178 | | 5,473 | 86.7 | | 192.9 | | | | | |
| United States | (s) | 2,093 | | 1,752 | | 894 | | 3,737 | | 3,129 | | 1,597 | 119.4 | | 234.0 | | | | | |
| | | 20,973 | | 21,979 | | 23,115 | | 37,452 | | 39,249 | | 41,276 | 95.4 | | 90.7 | | | | | |
| Turkey | | 11,314 | | 9,396 | | 7,579 | | 20,314 | | 16,779 | | 13,534 | 121.1 | | 150.1 | | | | | |
| BARLEY | | | | | | | | | | | | | | | | | | | | |
| Spain | * | 44,093 | | 31,048 | (1) | 48,808 | * | 91,861 | | 64,685 | (1) | 101,684 | 142.0 | | 90.3 | | | | | |
| Finland | (2) | 3,395 | (2) | 4,156 | (3) | 4,158 | (2) | 7,073 | (2) | 8,658 | (3) | 8,663 | 81.7 | | — | | | | | |
| Greece | | 5,280 | | 4,877 | | 4,336 | | 11,001 | | 10,160 | | 9,034 | 108.3 | | 121.8 | | | | | |
| Hungary | (4) | 15,305 | (5) | 17,407 | (6) | 13,402 | (4) | 31,885 | (5) | 36,265 | (6) | 27,922 | — | | — | | | | | |
| Norway | | 2,016 | | 2,281 | | 2,678 | | 4,200 | | 4,753 | | 5,578 | 88.4 | | 75.3 | | | | | |
| Romania | (7) | 14,674 | | 17,999 | | 22,736 | (5) | 30,572 | | 37,498 | | 47,367 | — | | — | | | | | |
| Slovakia | | 6,028 | | 5,864 | | — | | 12,559 | | 12,218 | | — | 102.8 | | — | | | | | |
| Sweden | | 4,246 | | 5,517 | | 4,895 | | 8,846 | | 11,494 | | 10,198 | 77.0 | | 86.7 | | | | | |
| U.S.S.R.:Estonia | | 1,830 | | 1,985 | | 2,077 | | 3,812 | | 4,136 | | 4,328 | 92.2 | | 88.1 | | | | | |
| Canada | | 50,618 | | 49,511 | | 38,880 | | 105,454 | | 103,147 | | 81,001 | 102.2 | | 130.2 | | | | | |
| United States | | 147,850 | | 132,623 | | 98,233 | | 308,021 | | 276,298 | | 204,652 | 111.5 | | 150.5 | | | | | |
| Japon | | 37,198 | | 39,200 | | 34,300 | | 77,498 | | 81,669 | | 71,460 | 94.9 | | 108.4 | | | | | |
| Turkey | | 58,423 | | 50,601 | | 43,218 | | 121,716 | | 105,420 | | 90,040 | 115.5 | | 135.2 | | | | | |
| Egypt | | 5,315 | | 5,251 | | 4,951 | | 11,073 | | 10,939 | | 10,316 | 101.2 | | 107.3 | | | | | |

| COUNTRIES AND PRODUCTS | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | % 1940 | | | | | | | |
|---------------------------|------------------|---------|----------------------------|------------------|--------|----------------------------|---------------|------------------|-------|---------|-----|---------|-------|-------|
| | Thousand centals | | | Thousand bushels | | | 1939 = 100 | Average = 100 | | | | | | |
| | | | | | | | | | | | | | | |
| OATS | | | | | | | | | | | | | | |
| Greece. | | 3,840 | 3,343 | 2,479 | 12,001 | 10,447 | 7,748 | 114.9 | 154.9 | | | | | |
| Finland. | (2) | 13,140 | (2) | 16,935 | (3) | 16,010 | (2) | 50,030 | 77.6 | | | | | |
| Hungary. | (4) | 9,495 | (5) | 8,067 | (6) | 5,944 | (4) | 29,673 | (5) | 25,209 | (6) | 18,574 | — | — |
| Norway. | | 3,553 | | 4,427 | | 4,033 | | 11,103 | | 13,833 | | 12,603 | 80.3 | 88.1 |
| Romania. | (7) | 10,032 | | 10,736 | | 13,140 | (5) | 31,349 | | 33,548 | | 41,061 | — | — |
| Slovakia. | | 4,192 | | 3,439 | | — | | 13,100 | | 10,747 | | — | 121.9 | — |
| Sweden. | | 24,998 | | 28,328 | | 27,854 | | 78,119 | | 88,526 | | 87,042 | 88.2 | 89.7 |
| U.S.S.R.:Estonia | | 3,263 | | 3,295 | | 3,190 | | 10,196 | | 10,296 | | 9,968 | 99.0 | 102.3 |
| Canada. | | 131,853 | | 130,698 | | 110,641 | | 412,040 | | 408,432 | | 345,752 | 100.9 | 119.2 |
| United States. | | 389,847 | | 299,909 | | 304,176 | | 1,218,273 | | 937,215 | | 950,551 | 130.0 | 128.2 |
| Turkey. | | 7,848 | | 6,512 | | 4,842 | | 24,526 | | 20,351 | | 15,132 | 120.5 | 162.1 |

(w) Winter crop. — (s) Spring crop. — * Unofficial estimate.

(1) Average 1934 to 1936. — (2) Present territory. — (3) Former territory. — (4) Including the reannexed northern zone and Sub-Carpathia. — (5) Including the reannexed northern zone but excluding Sub-Carpathia. — (6) Territory as at the end of 1937. — (7) Not including Bessarabia and North Bucovina. — (8) Second estimate.

Areas, production and yields per acre in 1937.

| Cereals | Surfaces (thousands acres) | Production | Yield per acre |
|------------------|-------------------------------|--|------------------------------|
| Wheat | 102,261 | 000 centals 1,033,090 000 bushels 1,721,782 | centals 10.1 bushels 16.8 |
| Rye | 56,741 | 000 centals 649,043 000 bushels 1,159,009 | centals 11.4 bushels 20.4 |
| Barley | 22,680 | 000 centals 233,691 000 bushels 486,864 | centals 10.3 bushels 21.4 |
| Oats | 43,573 | 000 centals 481,932 000 bushels 1,506,027 | centals 11.1 bushels 34.6 |

In 1939, a year for which data on areas sown to the different cereals are still lacking, the yield by acre, according to the latest information, was as follows:

| | | |
|-------------------------|--------------|----------------|
| winter rye | 8.2 centals | (14.7 bushels) |
| winter wheat | 12.0 centals | (19.9 bushels) |
| spring wheat | 7.6 centals | (12.6 bushels) |
| spring barley | 11.4 centals | (23.8 bushels) |
| oats | 9.2 centals | (28.7 bushels) |

In Lithuania, areas production and unit yields of cereals in the year 1940 and 1939 were as follows:

| Areas (thousand acres) | | | Production | | | Yield per acre | | |
|---------------------------|-------|-------|-------------|---------|-----------|----------------|------|------|
| | 1940 | 1939 | | 1940 | 1939 | | 1940 | 1939 |
| Food cereals | 1,926 | 1,923 | 000 centals | 17,002 | 21,673 | centals | 8.8 | 11.2 |
| | | | short tons | 850,105 | 1,083,638 | short tons | 0.4 | 0.6 |
| Fodder cereals | 2,035 | 2,014 | 000 centals | 16,168 | 20,754 | centals | 7.9 | 10.3 |
| | | | short tons | 808,368 | 1,037,661 | short tons | 0.4 | 0.5 |

By November 5, threshing was nearly over in practically every part of the Union. At that date, harvested cereals were still to be threshed on only 4.2 per cent. of the total area.

By the same date winter sowings in the Union had been effected over an area of 89,471,000 acres, *i. e.*, 97.8 per cent. of the figure foreseen by the plan.

This Fall, rains were very heavy. Winter cereals developed quite well, and when the first snow fell, they were quite strong. A good drenching of the soil is a favourable condition for the growth of the cereals even at the beginning of next spring.

In Lithuania, the area sown this year to winter wheat is 318,000 acres as against 350,000 acres last year, *i. e.*, 9.2 per cent. less. The corresponding figures for winter rye are as follows: 1,468,000 acres and 1,419,000 acres *i. e.*, an increase of 3.4 per cent. At October 15, the state of culture of winter cereals in Lithuania, as expressed in the system of the country (4, good; 3, average), was 3.2 as against 2.6 at the same date last year for wheat, and 3.4 as against 2.6 for rye.

Argentina: According to the latest official report issued on November 3, by the Government of Argentina, the condition of the wheat crop at that time varied from good to excellent, thanks to the very favourable weather which prevailed in October in the cereal regions.

Chile: The following table contains the final estimates on the production of cereals in 1939/40, compared with 1938/39 and the average of the preceding five years:

| | | 1939-40 | 1938-39 | Average 1933-34 to 1937-38 | % 1939-40 1938-39 = 100 | Average 1933-34 = 100 |
|-----------------|-------------|---------|---------|----------------------------------|-------------------------------|-----------------------------|
| Wheat. | ooo centals | 18,967 | 21,307 | 18,738 | 89.0 | 101.2 |
| | ooo bushels | 31,611 | 35,510 | 31,229 | | |
| Rye | ooo centals | 139 | 202 | 175 | 69.1 | 79.4 |
| | ooo bushels | 249 | 360 | 313 | | |
| Barley. | ooo centals | 1,617 | 2,402 | 2,627 | 67.3 | 61.6 |
| | ooo bushels | 3,369 | 5,004 | 5,473 | | |
| Oats | ooo centals | 1,877 | 3,367 | 2,213 | 55.8 | 84.8 |
| | ooo bushels | 5,867 | 10,520 | 6,915 | | |

United States: During September and October weather conditions have been on the whole favourable for plowing and seeding winter wheat, except in some areas of the Central States and more generally in the South-East, owing to moisture deficiency.

Fall operations in the fields and plowing started by the end of August. During the first decade of September, seeding was begun in most areas and was practically ended by the beginning of November. During the second half of September and the first half of October, weather conditions were mostly favourable for seeding, germination, and growth of winter wheat, except in the South-East. During the second half of October, early stands were satisfactory, and by the end of the month crops in many sections benefited from the rains, which were needed.

CURRENT INFORMATION ON MAIZE.

Spain: The maize crop is generally estimated normal in irrigated and un-irrigated cultures.

Romania: About the middle of November the harvesting of maize was practically over. In spite of the fact that maize had been sown with great delay, it has ripened completely in the greatest part of the country.

Yugoslavia: During the first half of October the weather was cloudy and often rainy, but rather mild in the northwestern regions, and clear and rather warm in the south. Thus conditions were generally favourable to harvest operations which were going on nearly all over the country by the middle of October, except in the region

Production of maize.

| COUNTRIES | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | % of 1940 | |
|----------------------------------|------------------------|------------------------|----------------------------|-------------------------|------------------------|----------------------------|---------------|------------------|
| | 1,000 centals | | | 1,000 bushels of 56 lb. | | | 1939 = 100 | Average = 100 |
| United States | 1,362,773 | 1,466,717 | 1,174,369 | 2,433,523 | 2,619,137 | 2,097,088 | 92.9 | 116.0 |
| Canada | 3,802 | 4,534 | 3,780 | 6,789 | 8,097 | 6,750 | 83.8 | 100.6 |
| Romania ⁽¹⁾ | 88,384 | ⁽²⁾ 113,685 | ⁽²⁾ 91,497 | 157,828 | ⁽³⁾ 203,010 | ⁽⁴⁾ 163,387 | 77.7 | 96.6 |
| Yugoslavia | ⁽⁵⁾ 110,231 | 89,191 | 103,418 | ⁽⁵⁾ 196,842 | 159,269 | 184,676 | 123.6 | 106.6 |
| Hungary | ⁽⁵⁾ 65,345 | ⁽⁵⁾ 51,468 | ⁽⁵⁾ 50,840 | ⁽⁵⁾ 116,688 | ⁽⁵⁾ 91,907 | ⁽⁵⁾ 90,787 | — | — |
| Bulgaria | ... | 19,621 | 17,910 | ... | 35,038 | 31,981 | ... | ... |
| Manchukuo | 75,103 | 54,234 | 44,198 | 134,113 | 96,847 | 78,926 | 138.5 | 169.9 |
| Turkey | 16,050 | 15,744 | 12,309 | 28,660 | 28,114 | 21,980 | 101.9 | 130.4 |

(1) Without Bessarabia and Northern Bukovina. — (2) Approximate unofficial data. — (3) Including the reincorporated northern zone and Sub-Carpathia without northern Transylvania. — (4) Including the reincorporated northern zone without Sub-Carpathia and northern Transylvania. — (5) Hungarian territory at the end of 1937.

of the southern Banat, where cold weather and frequent rains hindered the ripening of the crop. Sunny, though colder, weather in the second part of the month helped the harvest of maize which is of good quality, but of a high degree of humidity. The official estimate of the production is not yet known, but from private sources it is confirmed that it is very abundant.

United States: During the last week of October, weather was favourable to corn husking and cribbing, but much corn was too moist for cribbing.

Manchoukuo: The area under maize in 1940 is estimated at 5,638,000 acres against 4,885,000 acres in 1939 and an average of 3,283,000 acres in 1934 to 1938; percentages, 115.4 and 171.7.

Egypt: The area under millet (sefi) in 1940 is estimated at 281,000 acres against 317,000 acres in 1939 and an average of 244,000 acres in 1934 to 1938; percentages, 88.6 and 115.4.

CURRENT INFORMATION ON RICE.

United States: According to the most recent estimate the production of rice (rough) this year is about 23,366,000 centals (51,924,000 bushels) against 23,538,000 (52,306,000) in 1939 and 21,078,000 (46,839,000) on the average of the five years ending in 1938; percentages 99.3 and 110.9.

Japan: The production of rice in 1940-41 is estimated at 258,266,000 centals (573,913,000 bushels) against 282,316,000 (627,356,000) in 1939-40 and an average of 252,726,000 (561,602,000) from 1934-35 to 1938-39; percentages, 91.5 and 102.2.

Manchoukuo: According to the first estimate the area cultivated to rice this year is about 1,046,000 acres against 951,400 in 1939 and 692,400 on the average of the five years ending 1938; percentages, 109.9 and 151.1. The corresponding production of paddy is estimated at about 20,780,000 centals (46,176,000 bushels) against 17,406,000 (38,679,000) and 12,368,000 (27,484,000); percentages, 119.4 and 168.0.

Egypt: The area under rice (sefi) in 1940 is estimated at 517,000 acres against 546,000 acres in 1939 and an average of 411,000 acres in 1934 to 1938; percentages, 94.6 and 125.8.

CURRENT INFORMATION ON POTATOES.

Belgium: The Ministry of Agriculture had decided to devote 435,000 acres to the cultivation of potatoes in 1940: probable production expected therefrom, 97,000,000 centals, 162,000,000 bushels. These figures are the same as those of 1932. In the following years they gradually decreased. In 1938 the area sown to potatoes was 363,000 acres, and the relative production was figured at 71,800,000 centals, 120,000,000 bushels. The purport of this decision of the Ministry of Agriculture was to completely fill the food needs of the country.

Spain: The potato crop forecast is good, although in some regions the plants were damaged by maladies and pests. According to an unofficial source, the production is estimated at from 84,000,000 to 88,000,000 centals (140,000,000 to 151,000,000 bushels).

Yugoslavia: Weather conditions in September and October were generally favourable to the growth of potatoes, which about the middle of October were nearly ripe and well shaped in many sections of the country. The forecast is for an abundant and good quality production.

U. S. S. R.: In the Russian Federative Republic where most of the potato production in the Soviet Union is concentrated, the average yield per acre this year is 41 centals (68 bushels) higher than last year. By October 15, in the whole of the Union potatoes had been harvested over 77 per cent. of the cultivated area. (For Lithuania, see table on production).

Argentina: In September the planting of potatoes was being carried on in the most important centers of potato production in the country. In the provinces of Santa Fé and Tucumán the area sown to potatoes this year will be greater than that of last year.

Production of potatoes.

| COUNTRIES | British units | | | American Units | | | % 1940 | |
|--|------------------|------|----------------------------|-------------------------------|------|----------------------------|--------|---------|
| | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | 1939 | Average |
| | Thousand centals | | | Thousand bushels of 60 pounds | | | 100 | 100 |
| Germany { a) 1,298,527 1,240,766 (1) 1,136,266 2,164,169 2,067,902 (1) 1,893,739 104.7 114.3 | | | | | | | | |
| Finland { b) 112,000 — — 246,919 — — 114.3 — | | | | | | | | |
| Hungary (2) 75,870 (1) 50,553 (2) 47,014 (3) 126,448 (1) 84,253 (1) 78,356 — — | | | | | | | | |
| Luxemburg 5,467 5,683 4,482 9,112 9,472 7,470 96.2 122.0 | | | | | | | | |
| Norway 24,890 17,790 19,670 41,482 29,650 32,782 139.9 126.5 | | | | | | | | |
| Romania (6) 30,844 29,344 — 51,405 48,905 — 105.1 — | | | | | | | | |
| Sweden 49,377 41,189 41,011 82,294 68,648 68,350 119.9 120.4 | | | | | | | | |
| U.S.S.R. 58,601 51,887 (4) 48,309 97,666 86,477 (4) 80,513 112.9 — | | | | | | | | |
| Lithuania — — — — — — — — | | | | | | | | |
| United States 236,359 218,410 227,263 393,931 364,016 378,772 108.2 104.0 | | | | | | | | |

a) Not including: Danzig-Western Prussia, Wartheland, Protectorat of Bohemia-Moravia and Generalgouvernement. — b) Danzig-Western Prussia and Wartheland.

(1) 1932-1938. — (2) Previous territory. — (3) Including the northern region reattached and Subcarpathia. — (4) Including the northern region reattached, but not including Subcarpathia. — (5) Territory at the end of 1937. — (6) Not including Bessarabia and northern Bucovina.

SUGAR SEASON.

Warm weather favoured operations in the countries of northern Europe, where at the end of October sugar beets which were still in the fields, had not yet been harvested and taken to the factories.

The information which reached the Institute after the publication of the October Bulletin, confirms, in most of the cases, the first estimates. The only exception concern Hungary and Yugoslavia. In fact the latest estimate for Hungary shows an increase of 8 per cent. over the figure given in October. After the harvest, it was noticed that the roots were particularly well developed and healthy. As regards Yugoslavia, on the contrary, the latest estimate shows a reduction of 13 per cent. over the figure given in October. In absolute opposition to all previous information, a communication dated November 9, indicated a decrease of 15 per cent. in the sugar beet production in Yugoslavia.

Figures by M. F. O. Licht relative to the sugar beet production in Spain, have been substituted by those given out by the Secretary of the Mixed Agricultural Arbitration Commission of the Spanish Ministry of Agriculture. The difference between the two is of little account. As regards Romania, figures received from the Romanian Ministry of Finances as referring to the territory within the present boundaries, have been inserted.

No figures relative to this season production in Germany and in the countries under German control are available.

Production of Beet-Sugar (raw).

| COUNTRIES | TOTAL PRODUCTION DURING THE SEASON | | | % 1940-41 | |
|---|---------------------------------------|-------------|----------------------------------|-----------|---------|
| | 1940-41 (1) | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 | Average |
| | thousand cents | | | = 100 | = 100 |
| Germany | ... | 2)3) 56,919 | 45,865 | ... | ... |
| Bohemia-Moravia | ... | 2) 10,340 | 14,323 | ... | ... |
| Slovakia | 2) 1,455 | 1,184 | ... | ... | ... |
| General Gouvernement (Poland) | — | 2) 1,923 | 10,828 | — | — |
| Belgium | 5,953 | 5,755 | 5,175 | 102 | 115 |
| Bulgaria | 882 | 661 | 353 | 133 | 250 |
| Denmark | 5,291 | 5,556 | 4,221 | 95 | 125 |
| Spain | 3,924 | 1,947 | 4,478 | 202 | 88 |
| Finland | 176 | 188 | 251 | 94 | 70 |
| France | ... | 22,779 | 21,349 | ... | ... |
| Hungary | 3,968 | 2,875 | 2,728 | 138 | 145 |
| Ireland | 2,205 | 1,436 | 1,816 | 154 | 121 |
| Italy | 11,000 | 10,472 | 7,826 | 105 | 141 |
| Netherlands | 6,063 | 5,083 | 4,990 | 119 | 121 |
| Romania | 2,394 | 3,736 | 2,561 | — | — |
| United Kingdom | 4) 11,464 | 12,103 | 11,300 | 95 | 101 |
| Sweden | 6,623 | 6,856 | 6,632 | 97 | 100 |
| Switzerland | 331 | 317 | 230 | 104 | 144 |
| Yugoslavia | 2,425 | 2,646 | 1,662 | 92 | 146 |
| <i>Total Europe (a)</i> | ... | 152,776 | 146,588 | ... | ... |
| U. S. S. R. | 5) 58,202 | 54,675 | 44,684 | — | — |
| Latvia | — | 882 | 1,070 | — | — |
| Lithuania | — | 530 | 503 | — | — |
| <i>Total Europe (b)</i> | ... | 208,863 | 192,845 | ... | ... |
| Canada | ... | 1,916 | 1,485 | ... | ... |
| United States | ... | 35,118 | 28,341 | ... | ... |
| <i>Total North America</i> | ... | 37,034 | 29,826 | ... | ... |
| Japan | ... | 689 | 982 | ... | ... |
| Turkey | 2,315 | 2,315 | 1,335 | 100 | 173 |
| <i>Total Asia</i> | ... | 3,004 | 2,317 | ... | ... |
| <i>GENERAL TOTALS</i> | (a) ... | 192,814 | 178,731 | ... | ... |
| | (b) ... | 248,901 | 224,988 | ... | ... |

(a) Not including U. S. S. R. — (b) Including U. S. S. R. — (1) Approximate data. — (2) Data of International Association for Sugar Statistics. — (3) Including the new Polish districts. — (4) Licht's estimate. — (5) Including the part of Poland incorporated in U. S. S. R., Latvia and Lithuania.

With these modifications and additions to the data published last month, the beetsugar production in all the European countries (including the U. S. S. R.) for which an estimate on this year production is available, appears 6 per cent. higher than that of 1939/40, and 23 per cent. above the average of the five preceding years.

CURRENT INFORMATION ON SUGAR.

Germany: According to an estimate made at the beginning of October by the statistical bureau of the Reich, the sugar beet crop of Greater Germany not including the newly acquired provinces of former Poland (Gaue), Dantzic-Western Prussia, Wartheland, and also the Protectorate of Bohemia-Moravia and the Generalgovern-

ment, is of about 406 million centals (20 million short tons) against 384 (19) in 1939 and an average of 289 (14) in the years 1932-1938. The estimate on the sugar beet production in the two eastern provinces mentioned above, is 62 million centals (3 million short tons). Thus the total production of sugar beets in Greater Germany without the Protectorate and the General Government would amount to 467 million centals (23 million short tons).

Spain: The forecast for the beet harvest in many regions of production is good. Only in the province of Grenada, the production appears below the average.

Hungary: The production of beetsugar in September was 10,384 centals (519 short tons) against 120,196 (6,010) in September 1939.

Romania: About the middle of November, the producers of sugar beets, and especially those who produced seeds for sowing, were faced with very serious difficulties on account of the lack of labour hands.

Slovakia: According to the most recent estimate, area cultivated to sugarbeet this year will be about 47,000 acres against 36,300 in 1939. Percentage 129.3.

The corresponding production is estimated at about 9,259,000 centals (463,000 short tons, against 7,716,000 centals (386,000 short tons) in 1939; percentage 120.0.

Chiefly on account of the unfavourable weather conditions during the agricultural season, the sugar beet production has not increased in proportion with the considerable extension of area. However, the sugar beet production this year is considered rather abundant. It is estimated that the sugar production from sugar beets will be considerably above the needs of the country, and there will be a large surplus for export.

Sweden: Results of the weekly analyses of sugarbeets.

1940-41 Season. — Analysis of Sugar-Beets.

| WEEK | Average weight of root | | | Average weight of leaves | | | Sugar content | | | Weight of sugar per root | | |
|------------------------|------------------------|------|-----------|--------------------------|------|-----------|---------------|------|-----------|--------------------------|------|-----------|
| | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 | 1940 | 1939 | 1934-1938 |
| | oz. | oz. | oz. | oz. | oz. | oz. | % | % | % | oz. | oz. | oz. |
| 4th week of September. | 16.9 | 18.6 | 18.3 | 14.3 | 12.5 | 12.8 | 18.2 | 17.9 | 17.8 | 3.1 | 3.3 | 3.3 |
| 5th week of September. | 18.4 | — | — | 14.3 | — | — | 18.4 | — | — | 3.4 | — | — |

Jugoslavia: According to the most recent estimate, area cultivated to sugar-beet this year will be about 104,000 acres against 116,500 in 1939 and 68,400 on the average of the five years ending 1938; percentages 89.3 and 152.1. The corresponding production is estimated at about 17,262,000 centals (863,000 short tons) against 20,333,000 (1,017,000) and 11,213,000 (561,000); percentages 84.9 and 153.9.

U. S. S. R.: Up to the 15th October, the picking of sugar beets in the collective exploitations, which represent about 95 % of the whole sugar beet production in the Union, had been completed over an area of 1,611,000 acres, i. e., 58 per cent. of the area sown to sugar beets. Unit yields this year are slightly higher than in 1939.

In Lithuania, the state of the culture of sugar beets at the 1st October 1940 was quoted 3.3 as against 3.2 at the same date in 1939.

Argentina: Cultural and industrial yields of cane sugar during the present season, varied from good to excellent in the provinces of Tucumán, Salta, Yujuy and Corrientes.

United States: The production of sugarbeets in 1940 is estimated at 232,660,000 centals (11,633,000 short tons) against 215,460,000 (10,773,000) in 1939 and an average of 179,416,000 (8,970,800) in 1934 to 1938; percentages, 108.0 and 129.7.

Production of Cane-Sugar.

| COUNTRIES | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | % 1939-40 | |
|------------------------------|-------------|---------|--|-------------|------------|--|-----------|---------|
| | | | | | | | 1938-39 | Average |
| | ooo centals | | | short tons | | | = 100 | = 100 |
| AMERICA. | | | | | | | | |
| Antigua. | 304 | 493 | 514 | 15,200 | 24,640 | 25,688 | 62 | 59 |
| Argentina | 11,442 | 10,244 | 8,147 | 572,000 | 512,190 | 407,341 | 112 | 140 |
| Barbados | 1,587 | 3,502 | 2,517 | 79,000 | 175,114 | 125,850 | 45 | 63 |
| Brazil. | 25,923 | 24,259 | 23,161 | 1,296,130 | 1,212,953 | 1,158,050 | 107 | 112 |
| Cuba | 62,567 | 61,730 | 57,752 | 3,128,000 | 3,100,000 | 2,887,585 | 101 | 108 |
| Ecuador | 507 | 483 | 413 | 25,000 | 24,100 | 20,657 | 105 | 123 |
| United States (La. & Fl.) | 10,582 | 11,660 | 7,196 | 530,000 | 583,000 | 359,800 | 91 | 147 |
| British Guiana | 3,505 | 4,239 | 3,978 | 175,000 | 211,954 | 198,899 | 83 | 88 |
| Surinam | 245 | 270 | 378 | 12,240 | 13,499 | 18,895 | 91 | 65 |
| Jamaica | 2,227 | 2,642 | 2,086 | 111,000 | 132,100 | 104,287 | 84 | 107 |
| Martinique. | 1,323 | 1,433 | 1,104 | 70,000 | 72,000 | 55,206 | 92 | 120 |
| Mexico | 6,834 | 7,772 | 6,037 | 340,000 | 388,602 | 301,854 | 88 | 113 |
| Peru | 8,686 | 8,157 | 8,702 | 434,000 | 410,000 | 435,102 | 106 | 100 |
| Puerto Rico | 20,393 | 17,042 | 18,515 | 1,020,000 | 852,000 | 925,750 | 120 | 110 |
| Dominican Republic | 9,965 | 9,524 | 9,030 | 498,000 | 476,000 | 451,494 | 105 | 110 |
| St. Kitts | 626 | 836 | 659 | 31,300 | 41,816 | 32,944 | 75 | 95 |
| St. Lucia | 220 | 180 | 168 | 11,000 | 9,016 | 8,424 | 122 | 130 |
| Trinidad | 2,866 | 2,877 | 2,983 | 140,000 | 143,870 | 149,129 | 100 | 96 |
| Venezuela | 551 | 540 | 489 | 28,000 | 27,000 | 24,472 | 102 | 113 |
| Total America | 170,353 | 167,883 | 153,829 | 8,515,870 | 8,409,854 | 7,691,410 | 101 | 111 |
| ASIA. | | | | | | | | |
| Taiwan | 26,630 | 33,671 | 19,895 | 1,331,500 | 1,683,500 | 994,719 | 79 | 134 |
| India | 72,532 | 56,879 | 59,190 | 3,630,000 | 2,840,000 | 2,959,455 | 128 | 123 |
| Japan | 3,386 | 3,596 | 2,359 | 169,300 | 179,800 | 117,951 | 94 | 144 |
| Java | 34,841 | 33,613 | 19,839 | 1,692,000 | 1,730,000 | 991,927 | 98 | 171 |
| Philippines | 24,912 | 22,708 | 23,455 | 1,250,000 | 1,140,000 | 1,172,739 | 110 | 106 |
| Total Asia | 161,301 | 151,467 | 124,738 | 8,072,800 | 7,573,300 | 6,236,791 | 106 | 129 |
| AFRICA. | | | | | | | | |
| Egypt. | 3,524 | 3,573 | 3,179 | 176,200 | 178,634 | 158,951 | 99 | 111 |
| Mauritius | 5,059 | 7,084 | 5,886 | 252,930 | 354,180 | 294,310 | 71 | 86 |
| Reunion | 1,622 | 1,890 | 1,745 | 81,100 | 94,505 | 87,267 | 86 | 93 |
| Union of South Africa | 11,623 | 11,616 | 9,426 | 581,100 | 580,800 | 471,290 | 100 | 123 |
| Total Africa | 21,828 | 24,163 | 20,236 | 1,091,330 | 1,208,119 | 1,011,808 | 90 | 108 |
| OCEANIA. | | | | | | | | |
| Australia | 20,724 | 18,437 | 15,933 | 1,040,000 | 921,900 | 796,647 | 112 | 130 |
| Hawaii | 19,268 | 19,401 | 18,961 | 963,000 | 970,000 | 948,051 | 99 | 102 |
| Fiji Islands | 2,205 | 2,654 | 2,912 | 100,000 | 132,700 | 145,602 | 83 | 76 |
| Total Oceania | 42,197 | 40,492 | 37,806 | 2,103,000 | 2,024,600 | 1,890,300 | 104 | 112 |
| TOTALS | 395,679 | 384,005 | 336,609 | 19,783,000 | 19,215,873 | 16,830,309 | 103 | 118 |

(1) Approximate data.

The production of sugarcane in 1940 is estimated at 105,140,000 centals (5,257,000 short tons) against 115,960,000 (5,798,000) in 1939 and an average of 100,112,000 (5,005,600) in 1934 to 1939; percentages, 90.7 and 105.0.

Egypt: According to the most recent estimate the area cultivated to sugarcane this year is about 79,700 acres against 75,100 in 1939-40 and 66,600 on the average of the five years ending 1938-39; percentages 106.1 and 119.6.

WINE PRODUCTION IN 1940.

During these last months the Institute received some information which has made it possible, even under the present circumstances, to give a rather concrete evaluation of the importance of the 1940 wine production in the greatest part of the wine producing countries.

In a general way conditions were unfavourable, and even very unfavourable, to the complete ripening and to the gathering of raisins, as well as to wine making. Thus forecasts on the quantity and quality of raisins are not good.

No direct information is available regarding France, and the production data are not known. It is known however that weather conditions at the beginning of the season were unfavourable to the vines and maladies caused considerable damage. In the evaluation of wine production in France, due account must be taken of the conditions under which vintages were effected owing to the situation created by the war. This year production is estimated somewhat lower than the abundant one of 1939.

In Italy, unfavourable weather conditions and especially frosts did considerable damage to the plants in many regions of the country. The wine production is estimated at only 748 million Imperial gallons (898 millions American gallons) against an average of 836 millions Imperial gallons (1,004 millions American gallons) in the five years 1934-38. The production of raisins is estimated at 115 million centals.

Information from Spain indicates that only in some regions, such as Catalonia, Valencia and Castellón the vintage was not an utter disaster. In the Mancha, damages caused by attacks of mildew and oïdium nearly destroyed the crop. Yields are generally very low.

This year wine production is considered poor also in Portugal, where almost all the wine regions were attacked by mildew and oïdium. The yield in wine is estimated at hardly one half that of 1939 which was below the average.

In Greece, on the contrary, conditions were satisfactory, and the wine production was high, while the production of raisins for direct consumption was very abundant. Damages done by mildew in some regions are considered of little importance.

In the Danubian countries the crop was considerably below the average, owing to cold rains and to cryptogamic maladies. Yields were particularly low in Romania. About the middle of November the forecast was for a production of wine of hardly 43.995.100 English gallons (52.834.160 American gallons), which would correspond to a unit yield of only 77.8 English gallons (93.4 American gallons) as against 278.8 English gallons (334.4 American gallons)

in 1939, and 289.3 English gallons (347.4 American gallons) in 1938. In Bulgaria vines were seriously damaged by oidium.

In Hungary, hail, rains and cold and wet weather hindered the work and the production of must was poor both as to quality and quantity.

In spite of an improvement in the weather conditions during the second half of September, the forecast for the production of wine in Yugoslavia is rather unfavourable, especially as regards the northern regions. Frequent rains in the first two weeks in October again damaged the conditions of vines.

In the central European countries the production was irregular, but yields were generally low. Unit yields in the U. S. S. R. and North Africa appear good.

According to the latest estimate, the production of raisins in the U. S. A. amounts to 50.6 millions centals. *i. e.*, slightly more than in 1939. In California autumn weather has been especially favorable to the maturing and harvesting of grapes.

The lack of statistical data make it impossible to estimate even approximately the volume of the wine production in the countries of the northern hemisphere during the present season. But in the whole, available information leads to the conclusion that the wine production was decidedly poor [in nearly all the countries under survey.

M. C.

CURRENT INFORMATION ON VINES.

Romania: According to a very recent estimate, the area devoted to vineyards over the present Romanian territory (due account having been taken of all the territorial cessions) amounts to 565,581 acres. If one considers that in 1939, vineyards in Romania covered 910,646 acres in former boundaries, it appears that there has been a decrease of 37.9 per cent. in the area devoted to vineyards in that country.

In proportion with cultural varieties, the above figures are distributed as follows:

| | 1940 acres | 1939 acres | % 1940 1939 = 100 |
|------------------------------------|---------------|---------------|----------------------|
| Native vines ungrafted | 63,062 | 99,412 | 63.4 |
| American vines grafted | 241,952 | 337,756 | 71.6 |
| Hybrid direct producers | 260,567 | 473,478 | 55.0 |
| American graft-supporter | 1,030 | 1,287 | 80.0 |
| Total | 566,611 | 911,933 | 62.1 |

CURRENT INFORMATION ON OLIVES.

Spain: Owing to insufficient rains during the fall, in some regions olives appear undeveloped.

In the province of Yaén and Ciudad Real the condition of the crop is good; in some zone of Catalogne, damages have been caused by pests. The total yield is estimated above average.

Yugoslavia: The ripening of olives was hindered by rainy weather in October both along the litoral and the southern section of the country. In Dalmatia the gathering of olives was started at the beginning of November. It is forecast that this year the olive crop will be much lower than last year: as a consequence prices of olive oil will probably be higher.

CURRENT INFORMATION ON FLAX.

U. S. S. R.: Flax was cut this year earlier than last year. The retting of flax in the fields and in the water was done this year with the same speed as last year. By October 15, the flax gathered from 3,079,000 acres had already been recovered from the fields or the water. At the same date last year the figure was 1,628,000 acres. It is hoped that the speed in the work of transformation of the flax will contribute to improve the quality of the fiber.

Argentina: According to the latest official report dated November 3rd, weather conditions in the month of October were favourable to the growth of the crop over most of the country. The condition of the crop at the end of October varied from good to excellent.

Area and Production of Flax.

| COUNTRIES | † AREA | | | | | † PRODUCTION | | | | | | | |
|-----------|-----------|---------|--------------------------------|--------------------|---------|--------------|-----------|--------------------|---------|---------|--------------------|--------------------|-------|
| | 1940 | 1939 | Aver. | % 1940 and | | 1940 | 1939 | Aver. | 1940 | 1939 | Aver. | % 1940 and | |
| | and | and | 1934 | 1940-41 | | and | and | 1934 | and | and | 1934 | 1940-41 | |
| | 1940-41 | 1939-40 | to 1938 and 1934-35 to 1938-39 | 1939 and 1939-1940 | Average | 1940-1941 | 1939-1940 | 1934-35 to 1938-39 | 1940-41 | 1939-40 | 1934-35 to 1938-39 | 1939 and 1939-1940 | Aver. |
| | ooo acres | | | | | ooo centals | | | ooo lb. | | | | |

Fibre.

| | | | | | | | | | | | | | |
|---------------------------|-------------------|-------------------|-------|-------|-------|-------------------|-------------------|------------------|----------------------|----------------------|-----------|--------|-------|
| Belgium . . . | 136 | 110 | 68 | 123.0 | 199.1 | ... | 1,031 | 478 | ... | 130,053 | 47,752 | ... | ... |
| Hungary . . . | 12 ^{a)} | 10 ^{a)} | 8 | — | — | 122 ^{a)} | 48 ^{a)} | 32 ^{a)} | 7,180 ^{a)} | 4,822 ^{a)} | 3,163 | — | — |
| Romania . . . | 34 | 30 | 60 | — | — | 122 | 126 | 194 | 12,163 | 12,596 | 19,360 | — | — |
| U. S. S. R. ^{a)} | 4,448 | 4,423 | 5,126 | 100.6 | 86.8 | ... | 13,889 | 12,258 | ... | 1,388,917 | 1,225,757 | ... | ... |
| Estonia . . . | ... | 57 | 66 | ... | ... | ... | 175 | 135 | 195 | 17,527 | 13,482 | 19,489 | 130.0 |
| Lithuania ^{a)} | 233 ^{a)} | 211 ^{a)} | 193 | 110.4 | — | 637 ^{a)} | 645 ^{a)} | 619 | 63,709 ^{a)} | 64,507 ^{a)} | 61,879 | 98.8 | — |
| Egypt . . . | 10 | 10 | 6 | 102.6 | 162.4 | 84 | 81 | 43 | 8,419 | 8,146 | 4,348 | 103.4 | 193.6 |

Linseed.

| | ooo bushels of 56 lb. | | | | | | | | | | | | |
|---|-----------------------|-----------------------|-------|-------|-------|---------------------|---------------------|---------------------|-----------------------|-----------------------|--------|-------|-------|
| Belgium . . . | 136 | 110 | 68 | 123.0 | 199.1 | ... | 553 | 304 | ... | 987 | 542 | ... | ... |
| Hungary . . . | 20 ^{a)} | 20 ^{a)} | 21 | — | — | 149 ^{a)} | 151 ^{a)} | 121 ^{a)} | 266 ^{a)} | 269 ^{a)} | 216 | — | — |
| Romania . . . | 34 | 30 | 60 | — | — | ... | 115 | 208 | ... | 205 | 371 | ... | ... |
| *U.S.S.R. ⁽¹¹⁾ ⁽¹²⁾ | ... | ... | 5,809 | ... | ... | ... | ... | 16,254 | ... | ... | 29,025 | ... | ... |
| Estonia . . . | ... | 57 | 66 | ... | ... | ... | 152 | 207 | ... | 271 | 369 | ... | ... |
| Lithuania ⁽¹²⁾ | 233 ⁽¹²⁾ | 211 ⁽¹²⁾ | 193 | 110.4 | — | 725 ⁽¹²⁾ | 725 ⁽¹²⁾ | 730 ⁽¹²⁾ | 1,294 ⁽¹²⁾ | 1,295 ⁽¹²⁾ | 1,303 | 99.9 | — |
| Canada . . . | 397 | 307 | 292 | 129.3 | 135.7 | 1,907 | 1,215 | 717 | 3,406 | 2,169 | 1,281 | 157.0 | 265.8 |
| United States . | 3,168 | 2,284 | 1,217 | 138.7 | 260.2 | 17,152 | 11,385 | 4,558 | 30,629 | 20,330 | 8,139 | 150.7 | 376.3 |
| India ⁽¹¹⁾ . . | 3,713 | 3,869 | 3,542 | 96.0 | 104.8 | 10,461 | 9,901 | 9,296 | 18,680 | 17,680 | 16,600 | 105.7 | 112.5 |
| Egypt . . . | 10 | 10 | 6 | 102.6 | 162.4 | 65 | 58 | 45 | 115 | 104 | 81 | 110.8 | 143.0 |
| Argentina . . | 6,760 ⁽¹¹⁾ | 7,600 ⁽¹¹⁾ | 7,391 | 88.9 | 91.5 | ... | 22,364 | 37,312 | ... | 39,935 | 66,629 | ... | ... |
| Uruguay . . | 460 | 584 | 370 | 78.7 | 124.1 | ... | 2,628 | 1,968 | ... | 4,693 | 3,515 | ... | ... |

† The years indicated are those of the harvest, single years referring to the Northern Hemisphere, double years to the Southern.

1) Including the reannexed north zone and Sub-Carpathia. — 2) Including the reannexed north zone but excluding Sub-Carpathia. — 3) Territory as at end of 1937. — 4) Not including Bessarabia and Northern Bucovina. — 5) "Dolgunez" variety grown for linseed and flax. — 6) Former territory. — 7) Approximate figure, not official. — 8) Flax and hemp. — 9) Actual territory. — 10) Total: varieties: Dolgunez and "Kudriash". — 11) Final report. — 12) Area sown.

CURRENT INFORMATION ON COTTON.

Jugoslavia: The area under cotton in 1940 is estimated at 14,100 acres against 13,900 acres in 1939 and an average of 6,500 acres in 1934 to 1938; percentages, 101.0 and 216.0.

U. S. S. R.: Cotton picking this year is progressing more slowly than last year. Up to the 15th October, in Kirghisia 31 % of the plan of delivery had been executed, in Usbekistan 40 %, and in Turkmenistan 47 %. At the same date in the preceding year, the corresponding percentages were: 74.58.59.

In Turkmenistan and Tadjikistan unit yields are considerably higher than last year. High yields have been registered also in Kirghisia.

United States: According to the weekly weather report, during the last week of October weather was favourable to cotton picking and ginning.

Summary of the Cotton Reports
issued by the Government of the United States, during
the cotton season (August 1-July 31).

| | Provisional estimates for dates indicated 1940-41 | Final estimates | | Percent. 1940-41 | |
|--|---|-----------------|----------------------------------|---------------------|----------------|
| | | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 = 100 | Aver. = 100 |
| Report referring to July 1: | | | | | |
| Area in cultivation (acres) | 25,077,000 | 24,683,000 | 29,132,000 | 101.6 | 86.1 |
| Report referring to August 1: | | | | | |
| Area left for harvest (acres) (1) | 24,616,000 | (2) 23,805,000 | (2) 28,400,000 | 103.4 | 86.7 |
| Crop condition (per cent. of normal) | 72 | 74 | (3) 71 | — | — |
| Production (4) | 11,429,000 | 11,816,000 | 12,713,000 | 96.7 | 89.9 |
| Yield of lint per acre, in lb. | 222.3 | 237.9 | (3) 198.1 | 93.4 | 112.3 |
| Cotton ginned to August 1 (5) | 32,187 | 137,254 | 107,222 | 23.5 | 30.0 |
| Cotton ginned to August 16 (5) | 169,420 | 357,197 | 341,902 | 47.4 | 49.6 |
| Report referred to 1 September: | | | | | |
| Area left for harvest (acres) (6) | 24,406,000 | (2) 23,805,000 | (2) 28,400,000 | 102.5 | 85.9 |
| Crop condition (per cent. of normal) | 74 | 70 | (3) 62 | — | — |
| Production (4) | 12,772,000 | 11,816,000 | 12,713,000 | 108.1 | 100.5 |
| Yield of lint per acre, in lb. | 250.7 | 237.9 | (3) 198.1 | 105.4 | 126.6 |
| Cotton ginned to September 1 (5) | 606,391 | 1,401,691 | 1,424,427 | 43.3 | 42.6 |
| Cotton ginned to September 16 (5) | 1,804,490 | 3,875,703 | 3,410,335 | 46.6 | 52.9 |
| Report referred to October 1: | | | | | |
| Crop condition (per cent. of normal) | 72 | 68 | (3) 63 | — | — |
| Production (4) | 12,741,000 | 11,816,000 | 12,713,000 | 107.8 | 100.2 |
| Yield of lint per acre, in lb. | 250.0 | 237.9 | (3) 198.1 | 105.1 | 126.2 |
| Cotton ginned to October 1 (5) | 3,924,094 | 6,682,066 | 6,012,716 | 58.7 | 65.3 |
| Cotton ginned to October 18 (5) | 7,028,141 | 8,877,681 | 8,379,164 | 79.2 | 83.9 |
| Report referred to November 1: | | | | | |
| Production (4) | 12,847,000 | 11,816,000 | 12,713,000 | 108.7 | 101.1 |
| Yield of lint per acre, in lb. | 252.1 | 237.9 | (3) 198.1 | 106.0 | 127.3 |
| Cotton ginned to November 1 (5) | 9,084,000 | 10,080,535 | 9,765,802 | 90.1 | 93.0 |
| Cotton ginned to November 14 (5) | 10,071,658 | 10,683,371 | 10,705,600 | 94.3 | 94.1 |

(1) Area in cultivation on July 1 less the ten-year (1930-39) average abandonment, from natural causes, 1.9 per cent. — (2) Area actually harvested. — (3) Ten-year (1920-38) average. — (4) In bales of 478 lb. net weight and exclusive of linters. — (5) In running bales, counting round bales as half bales and exclusive of linters. — (6) Per cent. of the acreage in cotton on July 1, 1940, which has been, or will be, abandoned, from natural causes: 2.6.

Egypt: The Egyptian Ministry of Agriculture announces that the cotton ginned in all the ginneries in Egypt since the beginning of the season to the end of September, is as follows, in bales of 478 lb. net weight:

| Varieties | 1940 | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 |
|--|---------|-----------|-----------|-----------|-----------|-----------|-----------|
| Giza 7 | 37,814 | 37,446 | 19,164 | 56,338 | 45,873 | 17,962 | 18,887 |
| Sakellaridis | 1,181 | 529 | 81 | 4,055 | 5,549 | 3,836 | 8,070 |
| Other varieties above: | | | | | | | |
| 1 1/8" | 6,130 | 6,663 | 2,940 | 8,996 | 6,921 | 2,862 | 3,828 |
| 1 1/4" | 3,117 | 5,586 | 2,220 | 3,876 | 2,441 | 2,499 | 2,884 |
| 1 1/2" | 182,799 | 160,303 | 183,657 | 279,108 | 316,079 | 179,345 | 197,955 |
| <i>Total</i> | 231,050 | 210,527 | 208,063 | 352,373 | 376,863 | 206,504 | 231,624 |
| Scario | 3,016 | 2,737 | 2,525 | 4,062 | 5,562 | 2,601 | 3,123 |
| Total production (including Scario) | ... | 1,815,240 | 1,728,090 | 2,281,223 | 1,887,164 | 1,768,581 | 1,565,583 |

CURRENT INFORMATION ON HEMP.

Yugoslavia: Contrary to previous forecasts, this year production of hemp fibre appears rather low. According to the most recent estimates the hemp fiber production this year amounts to 661,400 centals (66,139,000 pounds) against 1,180,000 centals (117,967,000 pounds) in 1939 and an average of 1,025,000 centals (102,473,000 pounds) in the five preceding years: percentages, 56.1 and 64.5.

Argentina: The weather, especially in the province of Santa Fe, was favourable to the working of the soil preparatory to the sowing of hemp.

CURRENT INFORMATION ON TOBACCO.

Bulgaria: During the summer the weather was dry and warm. In autumn rains were not too frequent, particularly in the regions of Nevrokop, Petritch, Peruchtitza, Oustina, Haskovo and Haramanli. This year the forecast is for a very good tobacco crop, both as to quantity and quality.

According to the most recent estimate area cultivated to tobacco this year will be about 130,300 acres against 105,700 in 1939 and 84,100 on the average of the five years ending 1938; percentages 123.2 and 154.9. The corresponding production is estimated at about 110,106,000 pounds against 89,072,000 and 67,112,000; percentages 123.6 and 164.1.

Argentina: Cultural works in the tobacco fields were done under favourable conditions. The weather in September and October was favourable to the transplantation of tobacco.

United States: The production of tobacco in 1940 is estimated at 1,319,946 thous- and lb. against 1,848,654 in 1939 and an average of 1,294,694 in 1934 to 1938; per- centages, 71.4 and 102.0.

CURRENT INFORMATION ON HOPS.

United States: The production of hops in 1940 is estimated at 40,260,000 lb. against 39,380,000 in 1939 and an average of 39,206,000 in 1934 to 1938; percentages, 102.2 and 102.7.

CURRENT INFORMATION ON OTHER PRODUCTS.**Tea.**

U. S. S. R.: According to the most recent estimate area cultivated to tea this year will be about 139,600 acres against 125,000 in 1939 and 98,800 on the average of the five years ending 1938; percentages 111.7 and 141.3. The corresponding production is estimated at about 28,329,000 lb. against 24,802,000 and 8,504,000; percentages 114.2 and 333.1. The strong difference between the percentages of areas and those of production must be attributed to the fact that new plantations have reached the productive phase.

Coffee.

Brazil: The policy of coffee destruction has been accentuated since the beginning of the new commercial season. The quantity of coffee eliminated from the markets during the month of September of this year amounted to 324,100 centals, and the total quantity destroyed in the first three months of the present commercial season (July 1-September 30 1939) amounted to 1,461,700 centals, against hardly 998,700 centals during the semester January-June 1940. The surplus coffee stocks destroyed in Brazil from 1931 (when the policy of regulated destruction began) to September 30, 1940, amounted to 92,742,200 centals. According to the D. N. C. (National Coffee Department), the quantity of coffee available in all the Brazilian ports at September 30, 1940, amounted to 2,813,100 centals, of which 1,858,500 centals in the harbour of Santos, 474,000 centals in the harbour of Rio de Janeiro, 194,000 centals in the port of Paranagua and the remaining 286,600 centals in the other Brazilian ports.

Groundnuts.

Argentina: The preparation of the soil and the operations for the sowings of groundnuts were effected under favourable conditions.

United States: The production of groundnuts in 1940 is estimated at 1,574,315 thousand lb. against 1,179,505 in 1939 and an average of 1,188,051 in 1934 to 1938; percentages, 133.5 and 132.5.

Egypt: The area under groundnuts in 1940 is estimated at 25,000 acres that is a figure almost identical to that of 1939, and an average of 23,000 acres in 1934 to 1938; percentages, 99.6 and 107.1.

Colza, Sesame and Soya.

Hungary: By the middle of November the sowings of winter colza had been completed nearly everywhere.

Romania: The area sown to colza this year is generally smaller than in the preceding years. Owing to the drought in the month of September and the first half of

October, the seeds had not germinated regularly. By the middle of November, however, the culture appeared in rather good condition.

Manchoukuo: According to the first estimate area cultivated to soyabeans this year is about 9,455,000 acres, against 10,287,000 in 1939 and 8,651,000 on the average of the five years ending 1938; percentages: 91.9 and 109.3. The corresponding production is estimated at about 96,704,000 centals (161,170,000 bushels) against 86,979,000 (144,663,000) and 89,808,000 (149,677,000); percentages: 111.2 and 107.7.

United States: The production of soybeans in 1940 is estimated at 47,508,000 centals 79,198,000, bushels) against 52,445,000 (87,409,000) in 1939 and an average 24,655,000 (41,091,000) in 1934 to 1938; percentages, 90.6 and 192.7.

Egypt: The area under sesame in 1940 is estimated at 18,000 acres that is a figure almost identical to that of 1939 and against an average of 20,000 acres in the period 1934-1938; percentages, 99.6 and 93.6.

CURRENT INFORMATION ON FODDER CROPS.

Germany: According to an estimate made at the beginning of October by the German Bureau of Statistics the forage beet production in Greater Germany including the newly acquired territories of the eastern provinces (Gau) Wartherland, Dantzig-Western Prussia, but not including the Protectorate of Bohemia-Moravia and the Generalgouvernement, amounts to 430 million centals (47 million short tons). The production of swedes amounts to 161 million centals (8 million short tons). Last year yields were equally good.

Finland: The hay production of artificial meadows in 1940 is estimated at 45,085,000 centals (2,254,000 sh. tons) as against 72,069,000 centals (3,603,000 sh. tons) in 1939; percentages, 62.6 and 58.6. The corresponding figures for the hay production of natural meadows are: 4,542,000 (227,000), 7,055,000 (353,000); percentages: 64.4 and 80.3.

Hungary: At the middle of November, it was estimated that, with some economies, the available quantity of forages would be sufficient for the feeding of cattle during the winter. The quality of forages is, generally speaking, very bad.

Norway: The production of the main fodder crops in 1940, compared with those of 1939 and the preceding five years' average is as follows:

| Crops | 1940 | 1939 | Average 1934-38 | 1940 | 1939 | Average 1934-38 | % 1940 | |
|--------------------------|-------------|--------|--------------------|----------------|-------|--------------------|--------|---------|
| | | | | | | | 1939 | Average |
| | | | | | | | = 100 | = 100 |
| | 000 centals | | | 000 short tons | | | | |
| Rotation meadows | | | | | | | | |
| (hay) | 37,069 | 51,746 | 51,332 | 1,853 | 2,587 | 2,567 | 71.0 | 72.2 |
| Permanent meadows | | | | | | | | |
| (hay) | 7,087 | 8,401 | 7,825 | 354 | 420 | 361 | 84.4 | 90.0 |
| Turnips | 9,568 | 7,847 | 11,423 | 478 | 392 | 571 | 121.0 | 83.8 |

U. S. S. R.: In Lithuania, the production of clover and other artificial meadows in 1940 was 16,336,000 centals (816,800 short tons) as against 17,286,000 centals (864,300 short tons) in 1939; yield per acre 20.4 centals (1.0 sh. tons) as against 21.8 centals (1.1

sh. tons) in 1939. The corresponding figures for forages of natural meadows are as follows: 18,198,000 centals (910,000 short tons) as against 23,713,000 centals (1,186,000 short tons); yields, per acre, 12.8 and 16.1 centals (0.6 and 0.8 short tons). For mangels the figures are: 23,934,000 centals (1,197,000 short tons), 24,088,000 centals (1,204,000 short tons); yields per acre, 166 and 170 centals (8 and 9 short tons).

Argentina: The conditions of pastures and artificial meadows in October were good all over the country.

LIVESTOCK AND DERIVATIVES

CATTLE IN CHILE.

(thousands of head)

| CLASSIFICATION | Estimate April 1, 1940 | Estimate April 1, 1939 | Census April 9, 1936 |
|----------------------------------|---------------------------|---------------------------|-------------------------|
| Calves and cows | 466 | 459 | 460 |
| Bulls | 49 | 46 | 58 |
| Steers | 398 | 385 | 474 |
| Oxen | 481 | 464 | 500 |
| Cows from 1 to 3 years | 322 | 309 | 331 |
| Cows over 3 yrs. | 704 | 693 | 750 |

CURRENT INFORMATION ON LIVESTOCK AND DERIVATIVES.

Switzerland: The favourable conditions which aided a good forage production had a favourable influence on the production of milk. According to the data furnished to the Union Suisse des paysans by 675 milk companies, the milk delivered in September amounted to 3.9 per cent more than in the same month in 1939. The increase was noticeable especially in the cantons of German Switzerland, where it amounted to about 5 per cent. In Romanish Switzerland, the increase was only 0.1 per cent; so there has been no change worth mentioning compared with last year. In September 1939, surveys showed a decrease in the milk deliveries of 3.6 per cent, compared with 1938. This year increase of 3.9 per cent makes up for last year deficit.

Argentina: The health conditions of the cattle during the month of October were generally good all over the country.

THE WORLD SILK SITUATION.

I. — WORLD COCOON PRODUCTION IN 1940.

Information collected by the Institute is now complete enough to give a sufficiently precise idea of the world cocoon production in 1940. Of course, it is the volume of the Japanese production that characterises the course of the campaign, as it represents on the average 85 per cent. of the total crop.

In Japan, the decrease of the production of mulberry leaves, due to last year's drought and to the damage done to the shrubs by frost at the beginning of last May in some prefectures which are very important silkgrowing regions, such as that of Nagano, has obliged silk-growers to incubate a smaller amount of eggs for spring rearings. Generally speaking, some complaints were also heard about a certain lack of workers. During those first rearings, weather conditions were good. For the same reasons and for fear of not obtaining sufficiently satisfactory prices, the amount of eggs incubated for summer and autumn rearings was small. On the whole, the amounts of eggs incubated in Japan this year were 2,8 per cent. less than in 1939 and 11,7 per cent. less than the average of 1934-1938. Yields were lower than last year, but notably above the average: in fact, 156 lb. of fresh cocoons were obtained this year per ounce of eggs against 161 lb. in 1939 and an average of 132 lb. during the preceding five years. The production of cocoons is believed at present to be 5,2 per cent. below that of 1939, but 4,2 per cent. above the average. These proportions are still liable to be modified as there is available as far as the summer and autumn production is concerned, only an estimate based upon the conditions prevailing at the end of last September.

In Italy, the silk campaign has given very good results, and the production would have been larger but for some damage done by bad weather in spring to the mulberry shrubs and for some cases of disease. At the end of June, the campaign was reputed to have been completed: the spring cocoon crop compulsorily delivered to the *Ammassi collettivi* is expected to be this year much larger than last year. The yields were very high ones. Experiments are now being made with a view to establishing in a rational manner autumn rearings in the provinces of the Kingdom where conditions are most favourable (Alessandria, Mantua, Verona, Milan, Udine, etc.). The amount of eggs incubated for the production of summer and autumn cocoons is estimated this year at 1,587 ounces. The Italian Government has guaranteed for 1940 a minimum price of Lire 6.80 per lb. of yellow cocoons (Lire 7.50 for white ones) against Lire 4.50 in the two preceding campaigns.

Information received from the Soviet Union and China is not complete. It is known that the production of cocoons has been satisfactory this year in the Uzbekistan, the most important silk-growing region of the Soviet Union. As the Soviet Government follows a programme of expanding silk-growing in the Union, and as the conditions of the campaign were favourable, it is very likely that this year's production will come near 55 million lb. of fresh cocoons.

According to unofficial data, the production of spring cocoons in the regions of Central China occupied by the Japanese has been satisfactory, a crop of over 22 million lb. being foreseen. Information about the unoccupied regions is too vague to allow of a general idea being formed as to the total Chinese production during the present year.

Details are lacking in the case of Corea, but it would seem that the campaign has not proved successful: the production of cocoons is supposed to have been about the same as the rather poor one, of 1939 and below the average.

In the other less important silk-growing countries, the results were as follows.

In Bulgaria, the state of mulberry shrub cultures and the condition of the leaves were on the whole good, but the campaign began only late in the year

Production of Fresh Cocoons.

| COUNTRIES | QUANTITIES OF EGGS PREPARED FOR INCUBATION | | | | PRODUCTION OF FRESH COCOONS | | | |
|---------------------------|---|---------|--------------------|--------------------|-----------------------------|-----------|--------------------|--------------------|
| | 1940 | 1939 | Average 1934-38 | Average 1929-33 | 1940 | 1939 | Average 1934-38 | Average 1929-33 |
| | 000 oz. | | | | 000 lb. | | | |
| EUROPE. | | | | | | | | |
| Bulgaria | ... | 42 | 32 | 32 | ... | 5,245 | 3,547 | 3,713 |
| Spain | ... | 4 | 11 | 17 | ... | 273 | 734 | 1,367 |
| France | ... | 7 | 14 | 28 | ... | 1,182 | 1,565 | 3,214 |
| Greece | ... | 60 | 63 | 60 | ... | 5,401 | 6,369 | 4,473 |
| Hungary | ... | 11 | 11 | 14 | ... | 1,093 | 745 | 1,283 |
| Italy | a) 505 | 487 | 405 | 748 | a) 76,474 | 62,638 | 57,530 | 94,083 |
| Yugoslavia | ... | 14 | 17 | 32 | ... | 1,548 | 1,173 | 1,953 |
| Other countries | ... | 60 | 11 | 14 | ... | 928 | 362 | 785 |
| Total Europe | ... | 685 | 564 | 945 | 91,500 | 78,300 | 72,000 | 100,900 |
| U. S. S. R. | ... | * 564 | 476 | 515 | ... | * 52,911 | 43,462 | 34,659 |
| AMERICA. | | | | | | | | |
| Brazil | ... | * 21 | 18 | 11 | ... | * 1,323 | 1,168 | 814 |
| ASIA. | | | | | | | | |
| Chosen | ... | 349 | 367 | 339 | ... | 45,512 | 51,835 | 40,468 |
| Iran | ... | 120 (1) | 95 | — | ... | 4,409 (1) | 3,810 (1) | 3,713 |
| Japan | { (a) (1,958) | (2,071) | (2,378) | (2,783) | (362,673) | (369,891) | (364,302) | (422,916) |
| | { (b) (2,589) | (2,610) | (2,769) | (3,362) | (349,427) | (380,834) | (319,107) | (397,773) |
| Total | 4,547 | 4,681 | 5,147 | 6,145 | 712,100 | 750,785 | 683,409 | 820,689 |
| Turkey | ... | * 49 | 49 | 53 | ... | 4,597 | 4,630 | 3,201 |
| Other countries | ... | 198 | 233 | 282 | ... | 14,820 | 14,489 | 18,190 |
| Total Asia | ... | 5,400 | 5,900 | 6,900 | 783,700 | 820,100 | 758,200 | 886,300 |
| Africa | ... | 0 | 0 | 0 | ... | 68 | 82 | 97 |
| GENERAL TOTAL | ... | 6,700 | 6,900 | 8,400 | 931,700 | 952,800 | 874,800 | 1,032,600 |

(*) Unofficial estimate.

(a) Spring cocoons. — (b) Summer-autumn cocoons.

(1) Average of four years. — (2) Average of three years. — (3) Preliminary estimate based on condition at the end of September.

and the conditions of the rearings remained below the normal level. A production about 10 per cent. lower than that of 1939 is foreseen, although a larger amount of eggs was incubated.

The results of the campaign in France are not known. In the spring of 1940, the Department of Agriculture decided to purchase the national production

of cocoons of the current campaign for the requirements of the defence of the country at a final price of 11.30 Francs per lb. exclusive of the State premium (3.70 Francs in 1939). The weather proved favourable during the first phases of the rearings, and, apart from some frosts, but little damage was done to the shrubs.

In Hungary, the results were poor. Generally speaking, neither the amount of available leaves nor their quality were good. It is thought that the amount of incubated eggs was nearly the same as in 1939, but the yields were poor and the production 9 per cent. lower than in the preceding year.

In Greece, the season proved on the whole favourable: the condition of the mulberry shrubs was good and the leaves abundant. The production is expected to exceed by 11 per cent that of the previous year and to come near to the average. It is true that the amount of eggs used was higher than in the 1939 campaign. The damage done to mulberry shrubs by bad weather in Yugoslavia was serious and the rearings progressed with some difficulty. The results were lower than the very good ones of last year, but still above the average. The 1940 crop has shown a considerable progress in Spain: the amount of incubated eggs was much higher than in 1939, and the crop proved more than double the preceding one. In Romania, the silkgrowing campaign was delayed by adverse circumstances, especially by lack of workers and bad weather, but the results may be considered good ones. The yields are above the average, if by 40 per cent. lower than the excellent ones of 1939.

As to the less important Eastern countries, it is known that the season was, generally speaking, a good one in Turkey, while the rearings there were late. The results have proved satisfactory, better than in 1939 and above the average of 1934-1938. In the Iran, cold weather and rains have hampered rearings, yet food was sufficient. The amount of incubated eggs proved less than in 1939, but yields were good, and the production of cocoons is thought to exceed that of the previous campaign.

Silk-growing developed rapidly in Brazil during the last years, and the authorities try to set up rearings in all the States of the Union, the North-Eastern regions proving particularly favourable for this purpose. The yields of the last campaign were satisfactory.

To sum up, it may be said that the results of the 1940 silkgrowing campaign have been below those of 1939, but above the average of the 1934-1938 campaigns; on the whole, the world production of fresh cocoons (excluding China and India): is estimated this year at 931,7 million lb., against 952,8 millions in 1939 (2,2 per cent. less) an average of 874,8 millions in the period of 1934-1938 (6,5 per cent. more) and an average of 1,032.6 millions in the period of 1929-1933 (9,8 per cent. less).

On the basis of this production of fresh cocoons, the world raw silk production in 1940 (excluding that of China and India) may be approximately put at 93 million lb.

While in former years all available official figures were used, such data are, on account of present circumstances, lacking in nearly all cases for the 1940 production, and the totals have been calculated on the basis of private information collected by the Institute.

It might be of interest to observe here that the world production of rayon and staple fibres beat a new record in 1939 by reaching 2,231 million lb., i. e. it exceeded that of 1938 by 15 per cent. (The world production of rayon was of only 457 million lb. in 1930). Germany took in 1939 the first place among the producing countries with slightly more than 25 per cent., being followed by Japan. After Japan, we notice, in order of importance, the United States, Italy and Great Britain.

II. — TRADE, PRICES AND STOCKS OF RAW SILK IN 1939-1940.

At the end of June 1939, the situation of the world silk market was rather favourable by reason of the following elements: home consumption in Japan increasing on account of the difficulty of obtaining imported fibres, good activity of the American market, notable depletion of stocks at the end of the campaign and finally prospects of a Japanese spring crop much smaller than in 1938. Thus the new 1939-40 campaign opened under favourable circumstances. During the July-September quarter, the market was strongly influenced by political factors, and the outbreak of the war gave origin to a considerable increase of purchases of silk on the consuming markets with the result of a rise of prices. The latter progressed constantly, especially in September. In October, the market remained active and the rising tendency prevailed still, so that quotations reached a high level. Business activity was rather uneven in November, showing a slightly downward trend. Prices resumed a rising tendency in December, especially on account of speculation. The first two months of 1940 saw a reaction on the silk market against the increase of prices, and the latter fell also owing to the decrease in American consumption and to information from Japan about the 1939 cocoon crop which appeared to be larger than expected. In March, there was in general but little activity upon the market, and at the end of the month there occurred a set-back due to the decreasing demand of the United States. The fall of prices continued in April, and that period was characterised by a stagnating activity. A certain stability began to prevail in the first days of May, and the market showed no notable variations; business was slack, and quotations remained in general firmer than in the preceding month. During the last month of the year 1939-1940, the market was undecided, and the campaign ended with a downward trend in prices; generally speaking, the market remained slack.

Thus the movement of prices in the year 1939-1940 may be represented by a very regular acute angle the summit of which corresponds to the maximum prices reached at the end of the first half-year. In fact, during the first six months of the year, prices rose with a constant tendency, and in the following six months they fell with a similar regularity: average prices in Yokohama per lb. of D grade 13-15 white were 9.34 Yen in July 1939, 16.42 Yen in December 1939 and 10.98 Yen in June 1940.

During the campaign under examination, monthly imports of raw silk into the United States averaged 3,809,500 lb., as compared with 4,209,700 lb. in 1938-1939 and 4,182,000 lb. in 1937-1938; these imports reached a maximum of 50,000

bales (6,613,900 lb.) in October 1939 and a minimum of 13,600 bales (1,799,000 lb.) in February 1940.

Out of the total deliveries to factories in 1939-1940, 83 per cent. were of Japanese, 13 per cent. of Chinese and 4 per cent. of Italian silk. Monthly deliveries were of 3,560,300 lb., as compared with 4,568,900 lb. in 1938-1939 and

United States. — Imports, Consumption, Stocks in the United States and Prices in New-York, of Raw Silk by commercial season.

| SEASON | IMPORTS | | DELIVERIES TO MILLS | | STOCKS AT THE END OF THE PERIOD | | PRICES in New-York Crack XX (78%) 13'15, Spot | |
|-----------------------------------|-------------------|-----------------------|---------------------|-----------------------|---------------------------------|-----------------------|---|--------------------------------------|
| | Total | Japa- nese silk | Total | Japa- nese silk | Total | Japa- nese silk | in dollars per lb. | in gold frances per kilogr. |
| | (lb.) | % | (lb.) | % | (lb.) | % | | |
| 1937-38: | | | | | | | | |
| July-September | 13,189,200 | 97 | 13,400,600 | 94 | 5,813,300 | 91 | 1.92 | 12.99 |
| October-December | 12,604,900 | 96 | 11,867,200 | 97 | 6,551,000 | 91 | 1.66 | 11.29 |
| January-March | 10,930,500 | 94 | 12,677,400 | 95 | 4,804,100 | 89 | 1.63 | 11.02 |
| April-June | 13,448,600 | 91 | 12,373,300 | 90 | 5,879,400 | 91 | 1.63 | 11.01 |
| <i>Total and Average.</i> | <i>50,173,200</i> | <i>95</i> | <i>50,318,500</i> | <i>94</i> | <i>—</i> | <i>—</i> | <i>1.71</i> | <i>11.58</i> |
| 1938-39: | | | | | | | | |
| July-September | 14,044,300 | 97 | 14,539,700 | 96 | 5,384,000 | 92 | 1.80 | 12.14 |
| October-December | 16,531,400 | 93 | 14,869,400 | 94 | 7,045,000 | 90 | 1.84 | 12.43 |
| January-March | 10,809,600 | 89 | 14,798,500 | 90 | 3,057,000 | 85 | 2.08 | 14.04 |
| April-June | 10,090,800 | 91 | 10,607,100 | 90 | 2,540,400 | 86 | 2.59 | 17.47 |
| <i>Total and Average.</i> | <i>51,476,100</i> | <i>93</i> | <i>54,815,100</i> | <i>93</i> | <i>—</i> | <i>—</i> | <i>2.08</i> | <i>14.02</i> |
| 1939-40: | | | | | | | | |
| July-September | 13,840,900 | 88 | 12,710,000 | 89 | 3,671,300 | 84 | 2.79 | 18.83 |
| October-December | 16,276,900 | 82 | 12,593,800 | 85 | 7,354,400 | 77 | 3.57 | 24.09 |
| January-March | 8,457,800 | 78 | 9,743,700 | 82 | 6,068,600 | 72 | 3.19 | 21.53 |
| April-June | 7,138,700 | 73 | 7,676,300 | 74 | 5,531,000 | 72 | 2.70 | 18.22 |
| <i>Total and Average.</i> | <i>45,714,300</i> | <i>82</i> | <i>42,723,800</i> | <i>83</i> | <i>—</i> | <i>—</i> | <i>3.06</i> | <i>20.67</i> |

4,194,100 lb. in 1937-1938. Thus the total movement of raw silk in the United States was smaller in 1939-1940 than in the two preceding years. The set-back was particularly noteworthy of late: it has been reckoned that the silk consumption of the American industry has decreased, during the first six months of 1940, by nearly 30 per cent., as compared with the first six months of 1939. As deliveries to factories were in 1939-1940 on the whole smaller than imports (by nearly 2,990,500 lb.), the stocks have increased during the campaign from 2,540,400 lb. at the end of June 1939 to 5,531,000 lb. at the end of June 1940.

As the stocking industry absorbs at present over 80 per cent. of the raw silk imports into the United States, it might be of interest to note the progress in that country of the production of artificial fibres specially adapted to meet the requirements of the said industry.

As to Japan, we note that the monthly exports of raw silk from Yokohama and Kobe averaged in 1939-1940 3,037,000 lb., as compared with 4,745,500 lb. in 1938-1939 and 5,018,000 lb. in 1937-1938, the highest monthly export figure having been reached in September 1939 with about 42,100 bales (5,568,900 lb.) and the lowest one in January 1940 with 13,500 bales (1,785,700 lb.).

Japan. — Exports of Raw Silk from Japan and Prices in Yokohama, by commercial season.

| SEASON | EXPORTS | | | PRICES IN YOKOHAMA Quality D. grade 13/15 White (basis for Open Contracts) | |
|--------------------------------|-------------------|---------------------------|-------------------|---|----------------------------------|
| | To America | To other countries (1) | Total | in yen per 100 kin | in gold francs per kilogr. |
| | (lb.) | (lb.) | (lb.) | | |
| 1937-38: | | | | | |
| July-September | 13,906,600 | 3,556,000 | 17,462,600 | 848.89 | 12.55 |
| October-December | 12,138,100 | 4,408,400 | 16,546,500 | 718.61 | 10.63 |
| January-March | 10,197,600 | 2,678,900 | 12,876,500 | 697.79 | 10.32 |
| April-June | 11,109,000 | 2,221,500 | 13,330,500 | 703.62 | 10.39 |
| <i>Total and Average . . .</i> | <i>47,351,300</i> | <i>12,864,800</i> | <i>60,216,100</i> | <i>742.23</i> | <i>10.97</i> |
| 1938-39: | | | | | |
| July-September | 14,963,700 | 2,263,900 | 17,227,600 | 777.78 | 11.28 |
| October-December | 15,482,100 | 3,049,200 | 18,531,300 | 817.78 | 11.46 |
| January-March | 8,404,300 | 1,702,300 | 10,106,600 | 948.75 | 13.20 |
| April-June | 9,630,000 | 1,439,100 | 11,069,100 | 1,177.39 | 16.39 |
| <i>Total and Average . . .</i> | <i>48,480,100</i> | <i>8,454,500</i> | <i>56,934,600</i> | <i>930.42</i> | <i>13.08</i> |
| 1939-40: | | | | | |
| July-September | 13,615,000 | 1,821,700 | 15,436,700 | 1,349.00 | 17.90 |
| October-December | 11,704,400 | 2,030,200 | 13,734,600 | 1,925.00 | 23.08 |
| January-March | 4,676,500 | 2,075,400 | 6,751,900 | 1,780.56 | 21.30 |
| April-June | 6,448,000 | 1,683,000 | 8,131,000 | 1,472.78 | 17.61 |
| <i>Total and Average . . .</i> | <i>36,443,900</i> | <i>7,610,300</i> | <i>44,054,200</i> | <i>1,631.83</i> | <i>19.97</i> |

(1) For the most part to European countries, the remainder to Australia, India and Africa.

Under the law for stabilising silk prices, the Department of Agriculture and Forests decided in May last to purchase, beginning with July 1940, raw silk on the market, whenever the price of a bale of silk (D grade 13-15 white) fell below 1350 Yen. During the July-September quarter, total Government purchases reached 54,030 bales (7,147,000 lb.).

As to China, we limit ourselves this year to giving the returns for exports from Shanghai, as those for Canton are no longer available, since September 1938, on account of the situation in the Far East. In 1939-40, Shanghai exports were much higher than in the preceding two years: monthly exports averaged 550,700 lb., as compared with 414,000 lb. in 1938-39 and 209,000 lb. in 1937-38.

During the first months of the campaign, the activity of the Shanghai market was but a very limited one, on account of the political situation in Europe, bu-

business with European countries being slack, while that with America showed a good recovery. In October, local quotations rose considerably, on account of the depleting of stocks, notwithstanding the slackness of the market. During the first months of 1940, there was but little business done, especially with Europe.

China. — Exports of Raw Silk from Shanghai by commercial season (June-May)

| SEASON | Exports | | | |
|------------------------------|------------------|------------------|--------------------|------------------|
| | To America | To Europe | To other countries | Total |
| | (lb.) | (lb.) | (lb.) | (lb.) |
| 1937-38: | | | | |
| June-August | 370,000 | 422,000 | 107,700 | 899,700 |
| September-November | 386,400 | 543,700 | 169,700 | 1,099,800 |
| December-February | 116,000 | 127,200 | 71,800 | 315,000 |
| March-May | 34,500 | 128,300 | 34,100 | 196,900 |
| <i>Total . . .</i> | <i>906,900</i> | <i>1,221,200</i> | <i>383,300</i> | <i>2,511,400</i> |
| 1938-39: | | | | |
| June-August | 313,300 | 392,500 | 223,500 | 929,300 |
| September-November | 745,000 | 425,100 | 255,500 | 1,425,600 |
| December-February | 721,300 | 504,800 | 184,500 | 1,410,600 |
| March-May | 755,500 | 358,900 | 92,200 | 1,206,600 |
| <i>Total . . .</i> | <i>2,535,100</i> | <i>1,681,300</i> | <i>755,700</i> | <i>4,972,100</i> |
| 1939-40: | | | | |
| June-August | 1,185,900 | 581,000 | 294,000 | 2,060,900 |
| September-November | 1,664,500 | 335,700 | 139,700 | 2,139,900 |
| December-February | 829,700 | 551,400 | 116,500 | 1,497,600 |
| March-May | 425,100 | 445,900 | 39,000 | 910,000 |
| <i>Total . . .</i> | <i>4,105,200</i> | <i>1,914,000</i> | <i>589,200</i> | <i>6,608,400</i> |

Notwithstanding the still reduced supplies, the tendency of the market was falling, and the silk year ended in Shanghai with an impression of calmness and slackness.

Maximum prices of the year were reached in December 1939 with 49.90 chinese dollars per lb. (Extra B, 20-22, 78 per cent.) as compared with a minimum at the beginning of the campaign (July 1939) of 16.70 chinese dollars per lb.

The Italian statistical services having suspended the publication of trade returns since October 1939, we cannot give the usual tables of imports and exports for that country. Generally speaking, it may be said, however, that the Italian market remained dull and firm during the 1939-1940 campaign. Its activity was moderate at the beginning of the latter year, being limited to the sale of the last stocks of the preceding campaign. It is only at the end of August that business was done for delivery to factories of cocoons of the 1939 crop. Up to December, the trend of the market was calm, and business rather slack, as its extent depended all the time upon the reduced supplies. The second half of the campaign did not present any noteworthy variations: the market remained sullen,

and business in general but limited. At the end of June 1940, supplies were much reduced. The price of 13-15 extra raw silk reached its maximum in March 1940 with 98 to 101 Lire per lb., and its minimum in October-November 1939 with 69 to 70 Lire per lb.

At the end of June 1940 stocks were considerably higher than the very low ones which existed at the end of June 1939. In fact, in the United States, stocks available for consumption were of 5.5 million lb. (against 2.5 million lb. at the end of June of the preceding year), and those in Japan totalised 2.4 million lb. (against 1.6 million lb. at the end of June 1939). In the Japanese stocks are not included the amounts recently purchased by the Japanese Government, which were estimated, on June 30th 1940, at 343,900 lb.

On June 30th 1940, the amounts of Japanese silk en route for New York were estimated at 2,9 million lb.

M. COSTA.

TRADE

| COUNTRIES | SEPTEMBER | | | | TWO MONTHS (August 1-September 30) | | | | TWELVE MONTHS (August 1-July 31) | |
|-----------|-----------|------|---------|------|------------------------------------|------|---------|------|-------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |

Wheat. — Thousand centals (1 cental = 100 lb.).

| | | | | | | | | | | |
|-----------------------------|-------|-------|-----|-----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 1,018 | 0 | 0 | 15 | 1,919 | 0 | 0 | 18,650 | 0 |
| Yugoslavia | 24 | 253 | 0 | 0 | 27 | 1,685 | 0 | 0 | 5,431 | 0 |
| United States | 593 | 1,518 | 433 | 416 | 1,153 | 5,059 | 789 | 983 | 13,134 | 6,173 |
| Argentina | 4,407 | 8,144 | — | — | 10,492 | 17,567 | — | — | 104,945 | 2 |
| Chile | ... | ... | ... | ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... |
| Uruguay | ... | ... | ... | ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... |
| Iraq | 1 | 118 | 0 | 0 | 7 | 224 | 0 | 0 | 1,394 | 2 |
| Turkey | 25 | 0 | — | — | 47 | 51 | — | — | 1,092 | 0 |
| | | | | | | | | | 1,402 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 0 | 0 | 280 | 13 | 0 | 0 | 280 | 52 | 0 | 535 |
| China | 0 | 39 | 297 | 80 | 2 | 74 | 515 | 613 | 263 | 3,081 |

Wheat Flour. — Thousand centals (1 cental = 100 lb.).

| | | | | | | | | | | |
|-----------------------------|-----|-------|-----|-----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Yugoslavia | 0 | 2 | 0 | 0 | 6 | 3 | 0 | 0 | 325 | 0 |
| United States | 857 | 1,312 | 30 | 25 | 1,709 | 2,576 | 48 | 51 | 11,758 | 129 |
| Argentina | 90 | 222 | — | — | 215 | 373 | — | — | 1,951 | — |
| Chile | ... | ... | ... | ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... |
| Uruguay | ... | ... | ... | ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... | (¹) ... |
| Iraq | 0 | 12 | 0 | 0 | 11 | 21 | 0 | 0 | 237 | 0 |
| Turkey | 0 | 1 | — | — | 0 | 1 | — | — | 176 | 0 |
| | | | | | | | | | 1 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 9 | 0 | 12 |
| China | 13 | 161 | 308 | 550 | 31 | 255 | 762 | 1,487 | 856 | 5,994 |

Total Wheat and Flour †. — Thousand centals (1 cental = 100 lb.).

| | NET EXPORTS (*) | | NET IMPORTS (**) | | NET EXPORTS (*) | | NET IMPORTS (**) | | N. EX. (*) | N. IMP. (**) |
|-------------------------|-----------------|-------|------------------|-----|----------------------|----------------------|------------------|-------|----------------------|----------------------|
| Portugal | — | — | 280 | 20 | — | — | 280 | 64 | — | 551 |
| Romania | 0 | 1,018 | — | — | 15 | 1,919 | — | — | 18,653 | — |
| Yugoslavia | 24 | 256 | — | — | 35 | 1,689 | — | — | 5,864 | — |
| United States | 1,263 | 2,817 | — | — | 2,579 | 7,443 | — | — | 22,467 | — |
| Argentina | 4,528 | 8,440 | — | — | 10,780 | 18,065 | — | — | 107,547 | — |
| Chile | ... | ... | ... | ... | (¹) ... | (¹) ... | ... | ... | (¹) ... | (¹) ... |
| Uruguay | ... | ... | ... | ... | (¹) ... | (¹) ... | ... | ... | (¹) ... | (¹) ... |
| China | — | — | 690 | 559 | — | — | 1,487 | 2,181 | — | 9,668 |
| Iraq | 1 | 134 | — | — | 22 | 252 | — | — | 1,327 | — |
| Turkey | 25 | 2 | — | — | 47 | 52 | — | — | 1,404 | — |

Rye. — Thousand centals (1 cental = 100 lb.).

| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
|-------------------------|---------|-----|---------|---|---------|-----|---------|---|---------|---------|
| Romania | 4 | 156 | 0 | 0 | 13 | 218 | 0 | 0 | 2,172 | 0 |
| United States | 134 | 0 | 0 | 0 | 134 | 0 | 0 | 0 | 411 | 0 |
| Argentina | 148 | 226 | — | — | 149 | 580 | — | — | 5,664 | — |
| Turkey | 0 | 2 | — | — | 0 | 26 | — | — | 195 | — |

(*) Excess of exports over imports. — (**) Excess of imports over exports.

† Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.333 centals of grain.

(1) Up to August 31. — (1) Up to June 30.

| COUNTRIES | SEPTEMBER | | | | Two MONTHS (August 1-September 30) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|-----------|-------|---------|------|------------------------------------|---------|---------|---------|-------------------------------------|--------------------------------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |
| | | | | | | | | | | |
| Barley. Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 704 | 0 | 0 | 0 | 1,647 | 0 | 0 | 2,329 | 0 |
| United States . . . | 2 | 329 | 94 | 0 | 76 | 668 | 177 | 92 | 1,645 | 290 |
| Argentina | 308 | 154 | — | — | 468 | 327 | — | — | 8,848 | — |
| Chile | ... | ... | — | — | ... | ... | — | — | (1) 547 | — |
| Iraq | 137 | 156 | 0 | 0 | 146 | 637 | 0 | 0 | 5,167 | 0 |
| Turkey | 0 | 0 | — | — | 0 | 156 | — | — | 1,037 | — |
| Oats. — Thousand centals (1 cental = 100 lb.) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United States . . . | 3 | 4 | 147 | 123 | 4 | 6 | 410 | 259 | 65 | 3,635 |
| Argentina | 42 | 344 | — | — | 80 | 999 | — | — | 8,396 | — |
| Chile | ... | ... | — | — | ... | ... | — | — | (1) 898 | — |
| Maize. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| ELEVEN MONTHS (November 1-September 30) | | | | | | | | | | TWELVE MONTHS (Nov. 1-Oct. 31) |
| <i>Exporting Countries:</i> | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Romania | 189 | 157 | 0 | 0 | 13,460 | 11,923 | 0 | 0 | 12,014 | 0 |
| Yugoslavia | 0 | 17 | 0 | 0 | 26 | 2,328 | 0 | 0 | 2,334 | 0 |
| United States . . . | 1,317 | 1,003 | 23 | 17 | 21,523 | 16,694 | 603 | 235 | 19,783 | 253 |
| Argentina | 1,021 | 6,275 | — | — | 44,263 | 70,608 | — | — | 75,057 | — |
| Iraq | 0 | 0 | — | — | 1 | 3 | — | — | 3 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 0 | 0 | 20 | 36 | 0 | 0 | 274 | 823 | 0 | 864 |
| Rice. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| NINE MONTHS (January 1-September 30) | | | | | | | | | | TWELVE MONTHS (January 1-Dec. 31) |
| <i>Exporting Countries:</i> | | | | | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| United States . . . | 248 | 382 | 18 | 39 | 2,431 | 2,581 | 310 | 607 | 3,093 | 711 |
| Iraq | 5 | 1 | 0 | 0 | 11 | 11 | 0 | 1 | 15 | 1 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 0 | 0 | 79 | 9 | 2 | 0 | 145 | 48 | 0 | 104 |
| Romania | — | — | 8 | 13 | — | — | 215 | 321 | — | 360 |
| Yugoslavia | 0 | 0 | 0 | 15 | 0 | 0 | 145 | 277 | 0 | 394 |
| Chile | — | — | ... | ... | — | — | 1) 2 | 1) 175 | — | 187 |
| China | 1 | 2 | 813 | 246 | 108 | 150 | 11,503 | 5,923 | 156 | 7,060 |

(1) Up to June 30.

| COUNTRIES | SEPTEMBER | | | | NINE MONTHS (January 1-September 30) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|--|-----------|-------|---------|--------|--------------------------------------|-----------|---------|---------|--------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Linseed. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 2 | 3 | 2 |
| Argentina | 474 | 1,992 | — | — | 14,440 | 22,580 | — | — | 26,082 | — |
| Uruguay | — | — | — | — | (1) 1,463 | (1) 2,085 | — | — | 2,403 | — |
| China | 0 | 0 | — | — | 16 | 84 | — | — | 99 | — |
| Iraq | 34 | 0 | — | — | 47 | 41 | — | — | 63 | — |
| Cotton. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | TWELVE MONTHS (August 1-July 31) | |
| United States | 483 | 3,486 | 20 | 49 | 829 | 4,621 | 71 | 116 | 1939-40 | 1939-40 |
| Argentina | 56 | 57 | — | — | 97 | 143 | — | — | 32,690 | 841 |
| Iraq | 2 | 0 | 0 | 0 | 2 | 8 | 0 | 1 | 573 | — |
| Turkey | 14 | 3 | — | — | 14 | 11 | — | — | 57 | 3 |
| | | | | | | | | | 129 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | — | — | 42 | 13 | — | — | 64 | 39 | — | 566 |
| Romania | 0 | 0 | 5 | 24 | 0 | 0 | 20 | 42 | 0 | 306 |
| Yugoslavia | 0 | 0 | 0 | 22 | 0 | 0 | 9 | 45 | 0 | 454 |
| China | 5 | 1 | 395 | 559 | 7 | 23 | 848 | 1,233 | 87 | 5,762 |
| Wool. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | TWELVE MONTHS (Sept. 1-Aug. 31) | |
| Argentina (a) | 8,320 | 5,452 | — | — | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Uruguay (a) | 3,876 | 3,829 | — | — | 203,232 | 299,135 | — | — | — | — |
| China (b) | — | — | — | — | 71,979 | 56,734 | — | — | — | — |
| Iraq (a) | — | — | — | — | 70,916 | 95,932 | — | — | — | — |
| Turkey (b) | — | — | — | — | 24,617 | 24,306 | — | — | — | — |
| | 176 | 62 | — | — | 1,290 | 6,671 | — | — | — | — |
| | 148 | 1,722 | 0 | 0 | 16,495 | 19,672 | 62 | 57 | — | — |
| | 2,992 | 1,409 | — | — | 6,923 | 21,272 | — | — | — | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 0 | 697 | 68 | 370 | 2,035 | 2,251 | 3,265 | 3,316 | — | — |
| Romania | 0 | 0 | 4,120 | 46 | 0 | 62 | 2,972 | 840 | — | — |
| Yugoslavia | 0 | 0 | 75 | 359 | 0 | 353 | 5,977 | 11,475 | — | — |
| United States | 0 | 0 | 21,832 | 29,624 | 485 | 417 | 312,037 | 209,676 | — | — |
| Chile | — | — | — | — | — | — | — | — | (1) 16,555 | (1) 152 |
| Butter. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | TWELVE MONTHS (January 1-Dec. 31) | |
| Portugal | 22 | 20 | 0 | 0 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Romania | 0 | 212 | 0 | 0 | 110 | 90 | 0 | 0 | 157 | 0 |
| United States | 265 | 254 | 99 | 79 | 315 | 712 | 0 | 0 | 935 | 0 |
| Argentina | 196 | 1,204 | — | — | 2,114 | 1,539 | 911 | 780 | 2,308 | 1,107 |
| | | | | | 19,187 | 11,182 | — | — | 19,744 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| China | — | — | 13 | 11 | — | — | 260 | 430 | — | 593 |
| Iraq | 0 | 0 | 2 | 4 | 0 | 2 | 26 | 35 | 2 | 40 |

(a) Unwashed wool. — (b) Washed wool.

(1) Up to August 31. — (2) Up to June 30.

| COUNTRIES | SEPTEMBER | | | | NINE MONTHS (January 1-September 30) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|-------------------------------|-----------|---------|---------|---------|--------------------------------------|------------|-----------|-----------|--------------------------------------|-----------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Cheese. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Portugal | 20 | 13 | 0 | 22 | 190 | 159 | 29 | 134 | 216 | 201 |
| Romania | 0 | 33 | 2 | 0 | 300 | 101 | 24 | 37 | 392 | 60 |
| Argentina | 990 | 1,063 | — | — | 6,034 | 4,105 | — | — | 5,467 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| United States . . . | 192 | 128 | 1,534 | 5,761 | 1,519 | 1,113 | 25,673 | 37,613 | 1,479 | 59,075 |
| Iraq | 0 | 0 | 2 | 0 | 0 | 15 | 26 | 44 | 15 | 60 |
| Cacao. — Thousand lb. | | | | | | | | | | |
| | | | | | TWELVE MONTHS (Oct. 1-Sept. 30) | | | | TWELVE MONTHS (Oct. 1-Sept. 30) | |
| <i>Exporting Countries:</i> | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Haiti | ... | ... | — | — | ... | ... | — | — | 3,979 | — |
| Dominican Republic . . . | ... | ... | — | — | (1) 49,278 | (1) 62,790 | — | — | 63,690 | — |
| Ecuador | ... | ... | — | — | (2) 17,481 | (2) 33,228 | — | — | 36,171 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 0 | 0 | 99 | 159 | 29 | 2 | 1,349 | 1,215 | — | — |
| Romania | — | — | 0 | 220 | — | — | 2,355 | 3,783 | — | — |
| United States | — | — | 55,854 | 30,704 | — | — | 665,635 | 583,184 | — | — |
| Chile | — | — | ... | ... | — | — | (2) 1,817 | (2) 1,164 | — | 2,081 |
| Uruguay | — | — | ... | ... | — | — | (1) 1,215 | (1) 1,032 | — | 1,334 |
| Tea. — Thousand lb. | | | | | | | | | | |
| | | | | | THREE MONTHS (July 1-Sept. 30) | | | | TWELVE MONTHS (July 1-June 30) | |
| <i>Exporting Countries:</i> | | | | | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |
| China | 2,844 | 3,408 | 1,135 | 1,219 | 13,426 | 12,641 | 3,810 | 4,502 | 84,492 | 18,576 |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | — | — | 20 | 33 | — | — | 55 | 84 | — | 384 |
| Romania | — | — | 7 | 128 | — | — | 64 | 333 | — | 836 |
| United States | — | — | 7,782 | 7,306 | — | — | 22,276 | 21,605 | — | 100,075 |
| Chile | — | — | ... | ... | — | — | ... | ... | — | 4,209 |
| Iraq | 0 | 0 | 483 | 412 | 0 | 0 | 1,563 | 1,415 | 7 | 6,748 |
| Turkey | — | — | 141 | 183 | — | — | 342 | 600 | — | 2,357 |
| Coffee. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Costa Rica | ... | ... | — | — | (1) 9,348 | (1) 4,641 | — | — | 41,771 | — |
| Guatemala | ... | ... | — | — | (1) 683 | (2) 8,287 | — | — | 90,496 | — |
| Haiti | ... | ... | — | — | ... | ... | — | — | 43,369 | — |
| Mexico | ... | ... | — | — | ... | ... | — | — | 69,549 | — |
| Brazil | 105,555 | 207,967 | — | — | 311,270 | 534,466 | — | — | 1,996,449 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Portugal | 192 | 229 | 1,541 | 2,136 | 1,874 | 644 | 4,661 | 4,449 | 3,754 | 18,682 |
| Romania | — | — | 375 | 564 | — | — | 1,122 | 1,667 | — | 5,053 |
| Yugoslavia | — | — | 1,684 | 1,213 | — | — | 5,650 | 4,114 | — | 14,692 |
| United States | 825 | 1,157 | 131,270 | 144,595 | 2,776 | 2,674 | 466,791 | 423,291 | 12,253 | 2,043,624 |
| Chile | — | — | ... | ... | — | — | ... | ... | — | 11,638 |
| Iraq | 0 | 0 | 170 | 170 | 0 | 0 | 403 | 567 | 0 | 2,776 |
| Turkey | — | — | 2,297 | 1,105 | — | — | 2,732 | 2,639 | — | 13,334 |

(1) Up to August 31. — (2) Up to July 31. — (3) Up to June 30. — (4) Up to May 31.

STOCKS**Total wheat in the United States ⁽¹⁾**

| LOCATION | First day of month | | | | |
|--|--------------------|-----------------------|----------------------|--------------|--------------|
| | October 1940 | July 1940 | April 1940 | October 1939 | October 1938 |
| | thousand cents | | | | |
| On farms | 215,848 | 51,313 | 94,490 | 203,195 | 240,847 |
| In interior mills and elevators | ... | 20,238 | 48,490 | 97,525 | 104,631 |
| Commercial wheat in store | 111,158 | ⁽²⁾ 52,395 | 63,241 | 97,227 | 83,564 |
| In merchant mills and elevators ⁽³⁾ | 62,694 | ⁽⁴⁾ 48,149 | 51,082 | 71,218 | 65,225 |
| Stored for others in merchant mills ⁽⁵⁾ | 17,297 | 6,429 | ⁽⁶⁾ 5,909 | 11,182 | 12,894 |
| <i>Total U.S. wheat as grain</i> | ... | 178,524 | 263,212 | 480,347 | 507,161 |
| Flour (in terms of grain) in merchant mills ⁽⁷⁾ | 14,103 | 12,882 | 12,163 | 12,357 | 13,153 |
| <i>Total U.S. wheat</i> | ... | 191,406 | 275,375 | 492,704 | 520,314 |
| Canadian wheat in store in bond in the U. S. | 20,401 | 13,064 | 13,415 | 6,886 | 1,096 |
| <i>Total wheat in the U. S.</i> | ... | 204,470 | 288,790 | 499,590 | 521,410 |

⁽¹⁾ Incomplete data: wheat in transit is not included, wheat-flour only if in mills. — ⁽²⁾ The figures of the partial quarterly census taken by the Bureau of Census (see next table) have been adjusted to allow for stocks in all mills. — ⁽³⁾ Including new wheat 1,883 thousand cents. — ⁽⁴⁾ Including new wheat 6,188 thousand cents. — ⁽⁵⁾ Calculated by the F. I. A.

Wheat and wheat-flour held by commercial mills in the United States ⁽¹⁾.

| LOCATION | Last day of month | | | | |
|--|-------------------|-----------|------------|----------------|------------------------|
| | September 1940 | June 1940 | March 1940 | September 1939 | September 1938 |
| | thousand cents | | | | |
| Wheat stocks, the property of commercial millers: | | | | | |
| Wheat held in mills, and mill-elevators attached to mills | 57,679 | 44,201 | 47,353 | 65,947 | 60,333 |
| Wheat in other elevators ⁽²⁾ | 13,629 | 9,936 | 10,116 | 17,588 | 18,620 |
| Wheat in transit to merchant mills and bought to arrive ⁽³⁾ | 8,497 | 8,075 | 8,684 | 10,522 | 8,012 |
| <i>Total</i> | 79,805 | 62,212 | 66,153 | 94,057 | 86,965 |
| Wheat-flour in mills and warehouses, and in transit, sold and unsold | 9,018 | 8,219 | 7,836 | 7,954 | 8,455 |
| Wheat stored for others in mills and mill-elevators and in all other positions | 15,913 | 9,801 | 7,608 | 15,965 | ⁽⁴⁾ 11,927 |
| <i>Grand total ⁽⁵⁾</i> | 108,693 | 83,838 | 85,036 | 121,465 | ⁽⁶⁾ 111,057 |

⁽¹⁾ Partial census by the Bureau of Census, including mills accounting for over 90% of the total capacity of all commercial mills. — ⁽²⁾ In country elevators, in public terminal elevators and in private terminal elevators not attached to mills. — ⁽³⁾ Of the quantities given under this item only about one-third are actually in transit. — ⁽⁴⁾ Including flour in terms of grain. — ⁽⁵⁾ Not including wheat stored for others outside mills and mill-elevators attached to mills.

Commercial cereals in store in Canada and the United States.

| PRODUCTS AND LOCATION | Friday or Saturday nearest 1st of month ⁽¹⁾ | | | | |
|---|--|------------------------|----------------|---------------|---------------|
| | November 1940 | October 1940 | September 1940 | November 1939 | November 1938 |
| | thousand cents | | | | |
| WHEAT: | | | | | |
| Canadian in Canada | ... | ⁽²⁾ 211,789 | 163,422 | 201,267 | 105,102 |
| U. S. in Canada | ... | ... | 374 | 581 | 244 |
| U. S. in the United States | 105,834 | 111,158 | 108,031 | 90,609 | 84,532 |
| Canadian in the United States | 21,980 | 20,401 | 16,696 | 9,485 | 2,872 |
| TOTAL | ... | ... | 288,523 | 301,942 | 192,750 |
| RYE: | | | | | |
| Canadian in Canada | ... | ⁽²⁾ 1,384 | 913 | 1,793 | 1,085 |
| U. S. in Canada | ... | ... | 13 | 13 | 13 |
| U. S. in the United States | 4,543 | 4,765 | 5,120 | 5,923 | 4,598 |
| Canadian in the United States | 1,873 | 1,873 | 1,873 | 538 | 24 |
| TOTAL | ... | ... | 7,919 | 8,177 | 5,720 |
| BARLEY: | | | | | |
| Canadian in Canada | ... | ⁽²⁾ 2,776 | 2,085 | 5,018 | 4,389 |
| U. S. in Canada | ... | ... | 0 | 2 | 366 |
| U. S. in the United States | 5,458 | 5,356 | 4,922 | 9,791 | 8,932 |
| Canadian in the United States | 329 | 414 | 566 | 277 | 81 |
| TOTAL | ... | ... | 7,573 | 15,088 | 13,768 |
| OATS: | | | | | |
| Canadian in Canada | ... | ⁽²⁾ 1,557 | 1,533 | 3,821 | 3,211 |
| U. S. in Canada | ... | ... | 6 | 79 | 268 |
| U. S. in the United States | 2,270 | 2,671 | 2,686 | 4,657 | 7,018 |
| Canadian in the United States | 177 | 176 | 78 | 301 | 0 |
| TOTAL | ... | ... | 4,303 | 8,858 | 10,497 |
| MAIZE: | | | | | |
| U. S. in Canada | ... | ... | 2,414 | 2,618 | 1,959 |
| Argentine in Canada | ... | ... | ... | 1 | 19 |
| South African in Canada | ... | ... | ... | 1,141 | 140 |
| Australian in Canada | ... | ... | ... | 0 | 133 |
| U. S. in the United States | 33,216 | 25,148 | 15,747 | 15,423 | 18,469 |
| TOTAL | ... | ... | ... | 19,183 | 20,720 |

⁽¹⁾ Friday for Canada, Saturday for the United States. — ⁽²⁾ Preliminary data for September 27.

Commercial cereals and oilseeds in store in Argentina.

| PRODUCTS AND LOCATION | First day of month | | | | |
|--------------------------------------|-----------------------|-----------------------|-----------------------|----------------|--------------|
| | October 1940 | September 1940 | August 1940 | October 1939 | October 1938 |
| | thousand cents | | | | |
| Wheat in the ports | 8,620 | 10,856 | 14,736 | ⁽¹⁾ | 5,184 |
| Wheat in other positions | 11,310 | 15,067 | 18,711 | ⁽¹⁾ | 14,804 |
| TOTAL | ⁽¹⁾ 19,930 | ⁽²⁾ 25,923 | ⁽³⁾ 33,447 | ⁽⁴⁾ | 19,988 |
| Rye | 4,521 | 4,754 | 4,637 | 1,094 | 194 |
| Barley | 4,259 | 4,574 | 4,512 | 956 | 480 |
| Oats | 3,052 | 3,224 | 3,239 | 2,482 | 813 |
| Maize in the ports | 5,762 | 5,273 | 5,418 | 6,906 | 3,850 |
| Maize in other positions | 4,256 | 10,263 | 6,500 | 7,322 | 10,169 |
| TOTAL | 10,018 | 15,536 | 11,918 | 14,228 | 14,019 |
| Canaryseed | 517 | 509 | 497 | 339 | 251 |
| Linseed in the ports | 2,886 | 3,114 | 3,235 | 1,547 | 2,304 |
| Linseed in other positions | 2,274 | 2,467 | 2,633 | 1,011 | 2,372 |
| TOTAL | 5,160 | 5,581 | 5,868 | 2,558 | 4,676 |
| Sunflowerseed | 2,414 | 2,556 | 2,645 | 864 | 1,538 |

⁽¹⁾ Including 16,423 thousand cents of 1939-40 crop. — ⁽²⁾ Including 20,460 thousand cents of the 1939-40 crop. — ⁽³⁾ Including 23,083 thousand cents of 1939-40 crop. — ⁽⁴⁾ Figures for wheat in store have been withheld by governmental order.

Cotton stocks on hand in the United States.

| LOCATION | Last day of month | | | | |
|---|-------------------|----------------|-------------|--------------|--------------|
| | October 1940 | September 1940 | August 1940 | October 1939 | October 1938 |
| | thousand cents | | | | |
| in consuming establishments | 6,654 | 3,873 | 3,623 | 7,201 | 7,415 |
| in public storage and at compresses . . . | 68,129 | 52,826 | 44,865 | 76,108 | 75,278 |
| TOTAL . . . | 74,783 | 56,698 | 48,488 | 83,309 | 82,693 |

PRICES

PRICES FOR CEREALS OF THE NEW CROP.

We are giving below some information about prices of cereals of the new crop in some countries.

Denmark.

In order to assure the regular supply of the market with the products required for human nutrition and stock-farming, the Government has instituted by a law, adopted on July 25, 1940, the obligatory stocking of cereals and has established at the same time the prices to pay to the producers for all quantities of cereals deriving from the new crop.

On the base of this law each producer is obliged to deliver all the quantities of wheat and rye, even if blended with other cereals. This obligatory delivery regards also fodder grains (barley, oats and miscellaneous). Each proprietor of farms whose ground-value is above 10,000 crowns is obliged to deliver the fodder grains in proportion to the ground-value of the farm concerned, in order that the total quantity of cereals for fodder and human nutrition to deliver varies between a minimum of 500 kg and a maximum of 800 kg per each 1,000 crowns of the ground-value.

The prices are fixed as follows:

- 28 crowns for *wheat* with a specific weight of 128 dutch pounds;
- 29 crowns for *rye* with a specific weight of 118 dutch pounds;
- 25 crowns for *barley* with a specific weight of 112 dutch pounds;
- 25 crowns for *oats* with a specific weight of 85 dutch pounds;
- 25 crowns for *seed-grain* blended with barley and oats.

These prices refer to merchandise of good quality, sound, well cleaned, not blended with other cereals and sufficiently dry, delivered to merchants, millers,

to the Union for concentrated fodder stuffs or to the nearest railway-station or harbour (on board).

In regard to the indicated specific weight, augmentations up to 3 pounds and diminutions up to 5 pounds, with a corresponding rise or deduction of 15 öre for each dutch pound more or less, are allowed. For merchandise blended with other cereals, deteriorated or with a specific weight surpassing the allowed reduction of 5 pounds, the price must be reduced proportionally.

The exceeding stock of fodder grains remaining to the producer can be sold freely at a price not above 28 crowns per 100 kg. For merchandise of extra quality or destined for a determined use (seed-grain, etc.), an augmentation of 2 crowns per 100 kg is allowed.

Spain.

Cereals. - In execution of the dispositions promulgated by the decrees of August 23, 1937 and October 27, 1939 regarding the reglementation of wheat, the Government has established, by decree of June 15, 1940, as follows:

Purchases of cereals and podded grains can be made in future only by the National Wheat Service (*Servicio Nacional del Trigo*). All producers or owners of these products are obliged to declare the quantities belonging to them.

For the agricultural year July 1, 1940 to June 30, 1941, the base price to be paid by the National Wheat Service has been fixed on 84.00 pesetas per 100 kg for *wheat*, quality-type "Arévalo", and half-soft, similar to this type, with a specific weight of 77 kg per hectolitre and 3 per cent. (maximum) impurities. This price refers to merchandise in bulk, free store-house of the National Wheat Service in Valladolid.

The buying-prices per 100 kg for the other cereals are as follows:

- Pesetas 70.00 for *rye*, at León;
- » 56.50 for *fodder barley*, at Valladolid;
- » 48.50 for *oats*, current quality, at Sevilla;
- » 70.00 for *maize*, current quality, at Sevilla.

These prices refer to sound merchandise, dry and well cleaned, in bulk, delivered to the corresponding store-house of the National Wheat Service.

These prices undergo augmentations or diminutions, according to the different commercial varieties and taking into account the quality and the regions of production.

Thus, these fixed buying-prices undergo a first diminution of pesetas 0.50 per 100 kg on January 1, 1941, and a second diminution of pesetas 0.50 as well on April 1, 1941.

For wheat with less than 1 per cent. impurities an augmentation of pesetas 1.50 and for wheat with less than 2 per cent. an augmentation of pesetas 0.75 is allowed. The prices of wheat with more than 3 per cent. and less than 6 per cent. impurities undergo a diminution of the base price in proportion to their percentage of impurities.

Rice. - According to an order, promulgated on September 15, 1940, the National Syndicat of Rice (*Sindicato Nacional del Arroz*) will pay to the producers for rough rice of the new crop the following base prices:

Pesetas 81 for the regions of production of Valencia, Castellon, Alicante, Murcia, Albacete and Gerona;

Pesetas 79 for the regions of production of the Ebro, Barcellona and the islands of the Baleares;

Pesetas 80 for the region of production of Andalusia;

Pesetas 121 for the special varieties "bomba", "bombon" and similar.

These prices refer to sound merchandise, dry and well cleaned, per 100 kg, free depot of production.

France.

The French Government, after the fixation of the wheat price of the new crop (see this *Crop Report*, Sept. 1940, p. 600), has now established, by decree published on September 17, 1940, the following prices to pay to the producer for the other cereals:

Francs 171 for rye, specific weight of 69 kg 500 to 70 kg 499;

Francs 160 for fodder barley, specific weight of 68 kg 499 to 69 kg 500;

Francs 145 for oats, black or yellow, specific weight of 49 kg 500 to 50 kg 499;

Francs 140 for oats, white, yellow or other, specific weight of 46 kg 500 to 47 kg 499.

For rye, a stocking-premium of one franc per 100 kg and per month will be paid, from October 1, 1940 onwards, thus the price for rye in August 1941 will be brought up to Francs 182.

Hungary. •

By a decision, promulgated on October 10, 1940, the Delegate for the control of prices has fixed the maximum prices of new maize to pay to the producers during the agricultural year 1940-41.

According to this decision the country has been divided up into six price-regions. In the price-region V Budapest is situated.

In the following table prices in pengös per 100 kg and per month are given.

| PERIOD | Price-region | | | | | |
|--------------------------|--------------|-------|-------|-------|-------|-------|
| | I | II | III | IV | V | VI |
| October 1940 | 14,20 | 14,45 | 14,70 | 14,95 | 15,20 | 15,95 |
| November " | 15,80 | 16,05 | 16,30 | 16,55 | 16,80 | 17,55 |
| December " | 16,60 | 16,85 | 17,10 | 17,35 | 17,60 | 18,35 |
| January 1941 | 17,30 | 17,55 | 17,80 | 18,05 | 18,30 | 19,05 |
| February " | 18,00 | 18,25 | 18,50 | 18,75 | 19,00 | 19,75 |
| March " | 18,80 | 19,05 | 19,30 | 19,55 | 19,80 | 20,55 |
| April " | 19,50 | 19,75 | 20,00 | 20,25 | 20,50 | 21,25 |
| May to Sept. " | 20,20 | 20,45 | 20,70 | 20,95 | 21,20 | 21,95 |

These prices refer to dry maize, free wagon of 15 metric tons or towboat.

For kiln-dried maize with 15 per cent. (maximum) humidity, the following increases per 100 kg are allowed:

| | | | | |
|----------|------|-----------|--------|------|
| October | 1940 | | Pengös | 5.50 |
| November | " | | " | 4.00 |
| December | " | | " | 3.30 |
| January | 1941 | | " | 2.70 |

For old maize the price established for Mai 1941 will be paid.

Romania.

By a decision of October 2, 1940, the Government has brought the compensating premium for insufficient crop from 15,000 lei up to 25,000 lei per wagon of 10 metric tons. Consequently the producer's price of wheat, fixed on August 1940 at 75,000 lei, is now 85,000 lei per wagon of 10 metric tons, for wheat with a specific weight of 74 kg per hectoliter and 3 per cent. (maximum) impurities, f. o. r. producer's station or wharf.

Subsequently, on October 29, 1940, also the prices for the other cereals, fixed by decree of August 10, 1940 for the agricultural year 1940-41 (see this *Crop Report*, September 1940, p. 601) have been augmented.

Thus, the new prices in lei per wagon of 10 metric tons, f. o. r. producers, station or wharf, are:

70,000 lei for *rye* specific weight 68 kg and 3 per cent. (maximum) impurities (quantities of wheat blended with the rye must be considered as rye);

50,000 lei for *barley* specific weight 58 kg and 4 per cent. (maximum) impurities;

52,000 lei for *oats* specific weight 40 kg and 4 per cent. (maximum) impurities;

52,000 lei for *maize* "dent" variety, 16 degrees of humidity, and 3 per cent. of grains affected by rust or deteriorated. This price must be augmented by 15 per cent. for the varieties "pignoletto" and "cinquantino" and by 10 per cent. for the variety "hanganesc".

The augmentations or diminutions referring to higher or lower specific weight and to the percentage of impurities remain the same as those established previously, e. g.:

Wheat, rye, barley, and oats: 1 per cent. more or less than the base price for each kg. more or less of specific weight, and for each per cent. impurities less or more than those indicated for the base quality;

Maize: 1 per cent. more or less than the base price for each degree of humidity less or more, and 1 per cent. less for each further percentage of grains affected by rust or deterioration.

Switzerland.

By a decision of October 29, 1940 the prices to pay to the producers for home grown cereals of the 1940 crop have been fixed as follows:

Francs: 42.00; 43.50 and 44.50 for *wheat*, specific weight 68 kg, standard type I (Barbut du Tronchet, Plaine etc.), II (Alpha, home-grown Manitoba, etc.) and III (Huron), respectively;

Francs 39.00 for *rye*, specific weight 62 kg;

Francs 40.00 for *meslin*, specific weight 68 kg;

Francs 36.00 for *spelt*, undecorticated, specific weight 32 kg.

These prices refer to 100 kg., delivery free railway-station, mill or storehouse. They come into force (retroactive) already on September 1, 1940, and are Frs. 2.00 for wheat, Frs. 5.50 for rye and spelt, and Frs. 4.00 for meslin higher than those fixed by order of February 16, 1940.

These prices are to be applied also on old stocks of cereals to be taken over by the Government.

PRICES BY PRODUCTS.

A) — Spot quotations. ¹⁾

| DESCRIPTION | Nov. 15, 1940 | Nov. 8, 1940 | Nov. 1, 1940 | Oct. 25, 1940 | Oct. 18, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|--|---------------------|--------------------|--------------------|---------------------|---------------------|--------------------|--------------|--------------|--------------------------|--------------------------|
| | | | | | | Oct. 1940 | Nov. 1939 | Nov. 1938 | 1939-40 ²⁾ | 1938-39 ³⁾ |
| Wheat | | | | | | | | | | |
| Braila: Home-grown, good qual. (lei p. ql.) ⁴⁾ | 850 | 850 | 850 | 850 | 850 | 850 | 440 | 384 | * 521 | 411 |
| Winnipeg: No. 1 Manitoba (cents p. 60 lb.) | ... | ... | ... | ... | ... | 70 1/4 | 59 1/4 | 76 | 76 | 62 |
| Chicago: No. 2 Hard Winter (cents p. 60 lb.) | 90 | 89 | 86 | 87 1/4 | 86 1/4 | 85 1/4 | 90 1/4 | 66 1/4 | 92 1/4 | 70 1/4 |
| Minneapolis (cents per 60 lb.): | | | | | | | | | | |
| No. 1 Northern | 86 1/4 | 86 1/4 | 83 1/4 | 84 1/4 | 84 | 82 1/4 | 88 | 70 1/4 | 91 1/4 | 74 1/4 |
| No. 2 Amber Durum | 79 1/4 | 72 1/4 | 73 1/4 | 75 1/4 | 75 1/4 | 73 1/4 | 79 | 60 1/4 | 80 1/4 | 68 1/4 |
| New York: No. 2 Hard Winter (f.o.b. cents per 60 lb.) | 108 1/4 | 107 1/4 | 104 1/4 | 106 1/4 | 105 1/4 | 104 1/4 | 111 | 79 1/4 | 112 1/4 | 84 1/4 |
| Buenos Aires (a): No. 2 Hard, 80 kg. per hl. (paper pesos per 100 kg.) | ... | ... | ... | ... | ... | ... | 6.31 | 6.27 | 7.66 | 6.89 |
| Rye. | | | | | | | | | | |
| Winnipeg: No. 2 rye (cents p. 56 lb.) | ... | ... | ... | ... | ... | ... | 56 1/4 | 38 1/4 | 59 1/4 | 40 1/4 |
| Minneapolis: No. 2 rye (cents p. 56 lb.) | 50 1/4 | 49 1/4 | 47 1/4 | 49 1/4 | 47 1/4 | 47 | 50 1/4 | 40 1/4 | 56 1/4 | 44 |
| Barley. | | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) ⁴⁾ | 500 | 500 | 470 | 470 | 475 | 474 | 416 | 332 | * 399 | 338 |
| Winnipeg: No. 4 West. (cents p. 48 lb.) ⁵⁾ | ... | ... | ... | ... | ... | ... | 38 1/4 | 32 1/4 | 43 | 34 1/4 |
| Chicago: Feeding (on sample; cents p. 48 lb.) | 43 | 43 | 43 | 43 | 41 | 42 1/4 | 38 1/4 | 41 1/4 | 42 1/4 | 40 1/4 |
| Minneapolis: No. 2 Feeding (cents p. 48 lb.) | 41 1/4 | 41 1/4 | 40 1/4 | 39 1/4 | 39 1/4 | 39 1/4 | 43 1/4 | 38 1/4 | 45 | 40 1/4 |
| Oats. | | | | | | | | | | |
| Winnipeg: No. 2 White (cents per 34 lb.) | ... | ... | ... | ... | ... | ... | 32 1/4 | 28 1/4 | 35 1/4 | 29 |
| Chicago: No. 2 White (cents per 32 lb.) | 40 | 38 1/4 | 36 1/4 | 37 | 35 1/4 | 34 1/4 | 39 1/4 | 28 | 39 | 30 1/4 |
| Buenos Aires (a): No. 2 White, 49 kg. per hl. (paper pesos p. 100 kg.) | ... | ... | ... | ... | ... | ... | 5.21 | 5.30 | 5.17 | 4.81 |
| Maize. | | | | | | | | | | |
| Braila: Average quality (lei p. 100 kg.) ⁶⁾ | 520 | 520 | ¹¹⁾ 580 | ¹¹⁾ 580 | ¹¹⁾ 580 | ¹¹⁾ 570 | 323 | 310 | 365 | 362 |
| Chicago: No. 3 Yellow (cents p. 56 lb.) | 65 1/4 | 63 1/4 | 62 1/4 | 65 1/4 | 66 | 65 | 49 1/4 | 45 1/4 | 53 1/4 | 51 1/4 |
| Buenos Aires (a): Yellow Plata (paper pesos per 100 kg.) | ... | ... | ... | ... | ... | ... | 7.09 | 6.00 | 6.11 | 6.89 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal.
— (a) Thursday prices.

(¹⁾ In relation to Government price fixing, numerous series are omitted from this table; notes concerning them have been given in various issues of the Crop Report: France: Sept. 1940, p. 600; Germany: Feb. 1940, p. 142, and July 1940, p. 478; Hungary: Sept. 1940, p. 600; Italy: Dec. 1939, p. 1163, and Sept. 1940, p. 601; United Kingdom: Nov. 1939, p. 1060. See also this issue, p. 607. — (²⁾ See also on p. 700 and Sept. 1940, p. 601. — (³⁾ Oct. 1939-May 1940: No. 2 Feeding barley; subsequently: Barley N. 3 Western. — (⁴⁾ Commercial season: August-July; for Maize: May-April. — (⁵⁾ 4 Oct. and 27 Sept.: 70 1/4; 20 Sept.: 69 1/4; 13 Sept.: 73 1/4; 6 Sept.: 72 1/4; Sept. average: 71 1/4. — (⁶⁾ 10 Oct. 6.30; 3 Oct. 6.25; 26 Sept.: 6.85; 19 Sept. 7.32; Sept. average: 7.58. — (⁷⁾ 4 Oct.: 42 1/4; 27 Sept.: 43 1/4; 20 and 13 Sept.: 42 1/4; 6 Sept.: 43 1/4; Sept. average: 42 1/4. — (⁸⁾ 4 Oct.: 36 1/4; 27 Sept.: 36 1/4; 20 Sept.: 32 1/4; 13 Sept.: 32 1/4; 6 Sept.: 31 1/4; Sept. average: 33 1/4. — (⁹⁾ 4 Oct.: 32 1/4; 27 Sept.: 31 1/4; 20 Sept.: 30; 13 Sept.: 31 1/4; 6 Sept.: 29 1/4; Sept. average: 30 1/4. — (¹⁰⁾ 10 Oct.: 3.35; 3 Oct.: 3.50; 26 Sept.: 3.70; 19 Sept.: 4.10; Sept. average: 4.00. — (¹¹⁾ Quotation for old crop. — (¹²⁾ 10 Oct.: 3.60; 3 Oct.: 3.50; 26 Sept.: 3.75; 19 Sept.: 3.85; Sept. average: 3.90.

| DESCRIPTION | Nov. 15, 1940 | Nov. 8, 1940 | Nov. 1, 1940 | Oct. 25, 1940 | Oct. 18, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|--|---------------------|--------------------|--------------------|---------------------|---------------------|------------------|--------------|--------------|-----------------|----------------|
| | | | | | | Oct. 1940 | Nov. 1939 | Nov. 1938 | 1939 | 1938 |
| | | | | | | | | | | |
| Linseed. | | | | | | | | | | |
| Buenos Aires (a): Current quality, 4 % impurities (paper pesos p. 100 kg.). | ... | ... | ... | ... | ... | (?) ... | 16.30 | 13.05 | 15.12 | 14.31 |
| London (c.i.f., shipping current or fol- lowing month; £ per long ton): | | | | | | | | | | |
| La Plata | 10- 0-0 | 10- 2-6 | 10-12-6 | 10-12-6 | 10-12-6 | *10-10-10 | *15- 5-0 | 10-12-6 | *12- 2-3 | 11-10-11 |
| Bombay | 16-12-6 | 16-12-6 | 16-15-0 | (?)16-15-0 | (?)16-15-0 | (?)16-15-0 | *18-18-9 | 12- 4-8 | *14-10-3 | 13- 3-9 |
| Minneapolis No. 1 Northern (cts. p. 56 lb.). | 160 | 157 1/4 | 148 1/4 | 147 1/4 | 146 1/4 | 145 1/4 | 179 1/4 | 179 1/4 | 180 | 190 |
| | | | | | | | | | 1939-40 (*) | 1938-39 (*) |
| Cotton. | | | | | | | | | | |
| New Orleans: Middling (cents p. lb.). | 9.88 | 9.70 | 9.45 | 9.51 | 9.41 | 9.46 n. | 9.38 | 8.71 | n. 10.03 | 8.75 |
| New York: Middling (cents per lb.). | 10.28 | 10.07 | 9.77 | 9.80 | 9.78 | 9.82 n. | 9.71 | 9.11 | n. 10.34 | 9.00 |
| Liverpool (pence per lb.): | | | | | | | | | | |
| Middling, super good | ... | ... | ... | ... | ... | ... | n. 7.56 | 5.86 | * 8.05 | 5.88 |
| Middling | 8.07 | 8.23 | 8.17 | 8.22 | 8.13 | 8.14 | 6.96 | 5.12 | 7.47 | 5.17 |
| São Paulo, g.f. | ... | ... | ... | ... | ... | ... | n. 7.07 | 5.16 | * 7.44 | 5.14 |
| Broach, good staple, f.g. (1). | n. 6.47 | n. 6.52 | n. 6.37 | n. 6.39 | n. 6.32 | n. 6.30 | n. 5.95 | 3.93 | n. 6.36 | *n. 3.92 |
| C.P. Oomra, good staple, superfine (1). | 6.86 | 6.91 | 6.76 | 6.78 | 6.71 | 6.69 n. | 6.24 | 4.05 | 6.50 * | 4.11 |
| Giza 7, f.g.f. | 12.56 | 13.23 | 13.22 | 13.18 | 13.11 | 13.10 | 7.93 | 8.25 | 9.58 | 7.22 |
| Upper Egyptian, f.g.f. | 11.84 | 12.57 | 12.53 | 12.51 | 12.41 | 12.41 | 7.58 | 6.44 | 9.32 | 6.06 |

B) — Quotations for future delivery.

| DESCRIPTION | Nov. 15, 1940 | Nov. 8, 1940 | Nov. 1, 1940 | Oct. 25, 1940 | Oct. 18, 1940 | MONTHLY AVERAGES | | | | |
|--|---------------------|--------------------|--------------------|---------------------|---------------------|------------------|--------------|--------------|--------------|--------------|
| | | | | | | Oct. 1940 | Nov. 1939 | Nov. 1938 | Nov. 1937 | Nov. 1936 |
| | | | | | | | | | | |
| Wheat. | | | | | | | | | | |
| Winnipeg (cents p. 60 lb.): | | | | | | | | | | |
| delivery October | — | — | — | 70 1/4 | 70 1/4 | 70 1/4 | — | — | — | — |
| " November | — | — | 71 1/4 | — | — | — | 70 1/4 | 59 | 115 1/4 | 108 1/4 |
| " December | 72 1/4 | 72 1/4 | — | 71 1/4 | 71 1/4 | 71 1/4 | 70 1/4 | 58 1/4 | 111 1/4 | 106 1/4 |
| " May | 76 1/4 | 76 1/4 | 75 1/4 | 75 1/4 | 75 1/4 | 75 1/4 | 75 1/4 | 61 1/4 | 110 | 107 1/4 |
| " July | 78 1/4 | 78 1/4 | 77 1/4 | — | — | — | 76 1/4 | 62 1/4 | 106 1/4 | 106 1/4 |
| Chicago (cents p. 60 lb.): | | | | | | | | | | |
| delivery December | 88 1/4 | 87 1/4 | 84 1/4 | 86 1/4 | 85 1/4 | 84 1/4 | 87 1/4 | 63 1/4 | 90 1/4 | 116 1/4 |
| " May | 87 1/4 | 86 1/4 | 83 1/4 | 85 1/4 | 84 1/4 | 83 1/4 | 86 | 65 1/4 | 90 1/4 | 114 1/4 |
| " July | 84 1/4 | 82 | 78 1/4 | 80 1/4 | 79 1/4 | 79 1/4 | 84 | 65 1/4 | 85 1/4 | 102 1/4 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery October | — | — | — | 6.00 | 5.60 | 5.95 | — | — | — | — |
| " November | 6.50 | 6.58 | n. q. | 5.91 | 5.61 | 5.98 | 6.31 | 6.13 | — | 10.76 |
| " December | 6.57 | 6.60 | n. q. | 6.05 | 5.81 | 6.09 | — | 6.18 | 11.81 | 10.44 |
| Rye. | | | | | | | | | | |
| Winnipeg (cents p. 56 lb.): | | | | | | | | | | |
| delivery October | — | — | — | 45 1/4 | 44 | 43 1/4 | — | — | — | — |
| " December | 47 1/4 | 47 | n. q. | 46 1/4 | 45 1/4 | 44 1/4 | 57 1/4 | 38 1/4 | 73 1/4 | 75 1/4 |
| " May | 50 1/4 | 49 1/4 | 47 1/4 | 49 | 48 1/4 | 47 1/4 | 60 1/4 | 40 1/4 | 75 1/4 | 74 1/4 |
| Chicago (cents p. 56 lb.): | | | | | | | | | | |
| delivery December | 46 1/4 | 45 1/4 | 44 1/4 | 45 1/4 | 45 1/4 | 45 1/4 | 53 1/4 | 41 1/4 | 69 1/4 | 91 |
| " May | 51 | 49 1/4 | 48 | 49 1/4 | 49 1/4 | 48 1/4 | 54 1/4 | 44 1/4 | 69 | 87 1/4 |
| " July | 52 1/4 | 50 1/4 | 48 1/4 | 49 1/4 | 50 1/4 | 49 1/4 | 54 1/4 | 45 | 65 1/4 | 80 1/4 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal. — (a) Thursday prices.

(1) As from March 15, 1939: "fair staple". — (?) Oct. 10: 9.15; Oct. 3: 8.85; Sept. 26: 9.05; Sept. 19: 10.00; Sept. av.: 10.12.

— (1) Shipping Nov.-Dec. — (2) Commercial season: August-July.

| DESCRIPTION | Nov. 15, 1940 | Nov. 8, 1940 | Nov. 1, 1940 | Oct. 25, 1940 | Oct. 18, 1940 | MONTHLY AVERAGES | | | | |
|--|---------------------|--------------------|-------------------------|---------------------|---------------------|-----------------------|--|--------------|---------------------|-------------------------|
| | 1940 | 1940 | 1940 | 1940 | 1940 | Oct. 1940 | Nov. 1939 | Nov. 1938 | Nov. 1937 | Nov. 1935 |
| Barley. | | | | | | | | | | |
| Winnipeg (cents p. 48 lb.): | | | | | | | | | | |
| delivery October | — | — | (¹) 41 1/8 | 42 1/8 | 39 1/8 | 39 1/8 | — | — | (¹) 60 | (¹) 62 1/8 |
| » December | 47 1/8 | 45 1/8 | n. q. | 40 1/8 | 39 | 39 | 43 1/8 | 34 1/8 | 57 1/8 | 61 1/8 |
| » May | 50 1/8 | 44 | 40 1/8 | 40 1/8 | 39 1/8 | 39 1/8 | 45 1/8 | 35 1/8 | 56 1/8 | 58 1/8 |
| Minneapolis (cents p. 48 lb.): | | | | | | | | | | |
| delivery December | ... | ... | ... | ... | ... | ... | 36 1/8 | 31 1/8 | 45 1/8 | 80 1/8 |
| » May | ... | ... | ... | ... | ... | ... | 38 1/8 | 34 1/8 | 45 1/8 | 72 1/8 |
| Oats. | | | | | | | | | | |
| Winnipeg (cents p. 34 lb.): | | | | | | | | | | |
| delivery October | — | — | (¹) 31 | 34 | 33 1/8 | 33 | — | — | (¹) 47 | (¹) 45 1/8 |
| » December | 34 | 32 1/8 | n. q. | 31 1/8 | 30 1/8 | 30 1/8 | 36 1/8 | 27 1/8 | 44 1/8 | 44 1/8 |
| » May | 32 1/8 | 32 1/8 | 30 1/8 | 30 1/8 | 30 1/8 | 30 | 38 1/8 | 28 | 43 1/8 | 45 1/8 |
| » July | 31 1/8 | 31 | — | — | — | — | — | 27 1/8 | — | — |
| Chicago (cents p. 32 lb.): | | | | | | | | | | |
| delivery December | 38 | 36 7/8 | 34 1/8 | 35 1/8 | 33 1/8 | 33 1/8 | 37 1/8 | 25 1/8 | 30 1/8 | 44 1/8 |
| » May | 36 1/8 | 35 1/8 | 34 | 34 1/8 | 33 1/8 | 33 1/8 | 35 1/8 | 26 1/8 | 29 1/8 | 43 1/8 |
| » July | 35 1/8 | 33 | 31 1/8 | 32 1/8 | 31 1/8 | 31 1/8 | 32 1/8 | 26 1/8 | 28 1/8 | 40 1/8 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery October | 3.70 | 3.60 | n. q. | 3.55 | 3.45 | 3.41 (¹) | 5.22 (¹) | 5.35 | — | — |
| Maize. | | | | | | | | | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | | |
| delivery December | 63 1/8 | 62 1/8 | 59 1/8 | 62 1/8 | 60 1/8 | 60 | 51 | 47 | 54 1/8 | 103 1/8 |
| » May | 64 1/8 | 63 1/8 | 60 1/8 | 62 1/8 | 61 1/8 | 61 | 53 | 50 1/8 | 57 1/8 | 97 1/8 |
| » July | 64 1/8 | 63 1/8 | 60 1/8 | 62 1/8 | 62 1/8 | 61 1/8 | 53 1/8 | 51 1/8 | 58 1/8 | 92 1/8 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery October | — | — | — | 6.00 | 3.22 | 4.12 | — | — | — | — |
| » November | 3.20 | 3.02 | n. q. | 5.91 | 3.25 | 4.15 | 7.24 | 6.02 | — | 5.50 |
| » December | 3.35 | 3.18 | n. q. | 6.05 | 3.35 | 4.26 | 7.30 | 6.20 | 7.66 | 5.58 |
| » February | 3.45 | 3.35 | — | — | — | — | (¹) 7.42 (¹) | 6.33 | 7.71 | 5.82 |
| Linseed. | | | | | | | | | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | | |
| delivery October | — | — | — | 8.95 | 8.80 | 8.97 | — | — | — | — |
| » November | 9.30 | 9.10 | n. q. | 9.08 | 8.85 | 9.05 | 16.56 | 13.02 | — | 14.02 |
| Duluth (cents p. 56 lb.): | | | | | | | | | | |
| delivery December | ... | ... | ... | ... | ... | ... | 172 1/8 | 173 1/8 | 195 1/8 | 204 1/8 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted.

(¹) November futures. — (²) January futures.

Prof. UGO PAPI, Segretario generale dell'Istituto, Direttore responsabile.

MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS

See latest information on page 749

THE PRESENT CONDITION OF THE WORK DONE IN VIEW OF THE SECOND WORLD AGRICULTURAL CENSUS

The purpose of this statement is to give a general review of the activity of the International Institute of Agriculture with regard to the Second World Agricultural Census and of the results which may be expected in this connection.

The matter deserves to be treated on account:

(a) of the importance of the initiative by which it is proposed to obtain that a census be taken in each country, this being a fundamental element of ascertaining the condition of its agriculture and of the progress of agricultural statistics;

(b) of the task of co-ordination undertaken in this field by our Institute, the interest of which is that the work done in the various countries be so organised as to assure results that would prove most useful, not only from the national point of view, but from the international one as well;

(c) of the fact that the methods followed by the Institute in organising this work of international collaboration show -- and this is particularly interesting at the present time -- the possibilities offered by its technical equipment, and especially the possibilities due to its relations to the Statistical Offices of the various countries, which allow it to obtain all the statistical information necessary for solving the economic problems related to agriculture which will have to be faced after the war.

I. -- Activity of the Institute with the view to organising the Second World Agricultural Census.

(1) The first basis for preparing the new Census was derived from the examination of the results of the First World Agricultural Census taken in 1930. The Institute has not failed to publish these results (which were accompanied by way of introduction by an extensive methodological study) in five volumes, and in two separate editions: a French one, in which all data were given in units of the decimal metric system, and an English one, in which the same data were shown in Anglo-Saxon measures.

(2) After having submitted the documents so collected to the several Governments, the International Institute of Agriculture requested all interested countries to send to Rome experts in order to discuss the programme of the 1940 agricultural census in a conference of agricultural statisticians which was expressly convoked at the seat of the Institute.

A first conference, which was held from October 7th to October 10th, 1936, examined various questions in connection with the new census and suggested, on the basis of the experience of the first census, a number of amendments being made in the standard form used in 1930. Following such suggestions, the Statistical Bureau of the Institute prepared a standard form for 1940 and submitted it to the various Governments for examination and advice. A second conference of agricultural statisticians was then convoked at the Institute in order to examine both the project itself and the observations and suggestions made by several governments. This conference was held at Rome from December 7th to December 13th, 1937. It suggested further modifications of the form to be drawn up for the 1940 census and the recasting of the introductory notes for the use of the Governments, and made also some recommendations as to the manner of organising and preparing the census and working out and publishing its returns.

(3) These various suggestions and recommendations were duly taken into account, and a booklet entitled "Programme of the World Agricultural Census of 1940" was finally prepared and forwarded to all Governments by the International Institute of Agriculture. The said booklet contains a foreward, introductory notes for the use of the Governments, a standard form of schedule and, as appendices, the reports of the two conferences of agricultural statisticians as well as the text of some resolutions relating to the World Agricultural Census.

(4) This preliminary work having been achieved, the several governments were requested:

(a) to join in the World Agricultural Census by taking each a special census in their own country. This census was to refer as a rule to the year 1939 in the case of countries belonging to the Northern hemisphere, and to the period extending from July 1st 1939 to June 30th 1940 in that of countries of the Southern hemisphere. Whenever this could not be done for some impellent reason, the year used for the purpose was to be chosen as near as possible to the suggested one;

(b) to be led, when organising their national Census, by the programme and the standard form drawn up by the International Institute of Agriculture according to the hints given at the conferences mentioned above, in which had taken part official statisticians of a large number of countries.

II. — Activity of the Institute with a view to making easier the task of the Governments and to speeding up the communication and the publication of the first returns of the Census.

(1) According to the decision taken by the second conference of agricultural statisticians (December 1937) upon the suggestion of the Colombian delegate, the Institute undertook to supply each interested country with all documents drawn up for the purpose of the census in other countries as soon as they were available. It asked all Governments to let it know whether they wished to avail themselves of this possibility, and requested them to supply it with their own material. The following were the countries (including those which had been represented at the conference where the said decision was taken) which have expressed the wish to join in such an exchange of documents through our Institute: Argentina,

Barbados, Belgium, [Bohemia-Moravia (Protectorate), Bulgaria, Burma, Cape Verde Islands, Ceylon, Cochinchina, Colombia, Curaçao, [Denmark, Dominica, Dominican Republic, Egypt, Finland, France, Germany, Greece, Hungary, India, Ireland, Italy, Japan, Latvia, Liberia, Lithuania, Luxemburg, Madagascar and Dependencies, Malta, Mexico, Mozambique, Norway, Holland, Poland, Portugal, Romania, [Santa Lucia, Spain, Sweden, [Switzerland, South Africa, Thailand, United Kingdom (England and Wales, Scotland, Northern Ireland), United States of America, Uruguay, Yugoslavia.

The Institute forwarded to each of these countries the documents supplied by the other ones as soon as they were received by it, up to the moment when the outbreak of the war and the interruption of the transports has made it impossible to continue to do so.

There is no need to emphasize the value of this task of the Institute thanks to which a large number of States have had the possibility of obtaining knowledge of the progress made in other countries as to organising the census, and of eventually adopting methods followed elsewhere. At the same time it is obvious that our frequent communications about the census were likely to keep alive the interest of the Governments in this initiative.

(2) As soon as the programme of the census was definitively established, the Institute took care to draw up according to it a number of questionnaires in blank, which were published in three editions - a French, an English and a Spanish one - and forwarded to all countries.

The opportunity of drawing up such questionnaires has been suggested by the experience of the First Census. Their purpose is a double one, viz.:

(a) to point out in a precise manner to the Statistical Offices of the various countries the essential data we wish to receive. Thus the said offices are enabled to organise the working out of the returns of their own censuses upon lines as uniform as possible, or, in the case of countries which are not yet in the position of having a proper census taken, to collect the best data available in order to answer the questions and thus to contribute to the common work, awaiting a more complete share in it on the occasion of some future census.

(b) to let us have as soon as possible the returns for the different countries. In fact, it is well known that in most countries a period of several years is required for working out and publishing all data, including many details of no importance for international purposes. It is to be hoped that, owing to the list of questions it has drawn up, the Institute will be able to receive much sooner the general data of an international interest without having to wait in each separate case for the final publication of the census returns, which often make out several big volumes.

The questionnaires were sent in March 1940 to all the countries of the world, with the necessary explanations and with an introductory letter showing the reason of their sending.

(3) As soon as some countries began publishing the first returns of their census, and as the latter gradually became available, the Institute took care to have them printed as an appendix to its *Monthly Crop Report and Agricultural Statistics*. Separate copies of them were printed and forwarded to all countries

of the world. In this manner it was meant to obtain the double advantage of utilising without delay the first general data available and of keeping alive interest in the census in all countries including even those which on account of special circumstances have not been able up to now directly to join in it. Indeed we must not forget that the decennial World Agricultural Census is an undertaking bound to improve but slowly, and that its progress has to be promoted by continuous advertising.

The data published up to now as appendices to the *Monthly Crop Report and Agricultural Statistics* refer to the census taken in the following countries:

- (1) Estonia (*Monthly Crop Report*, November 1939);
- (2) Germany (*Monthly Crop Report*, March 1940 and September 1940);
- (3) Latvia (*Monthly Crop Report*, April 1940);
- (4) Norway (*Monthly Crop Report*, September 1940).

III. -- Countries which have decided to join in the Second World Agricultural Census.

(1) Through the exchange of letters with the Governments, the impression was gained that the Second World Agricultural Census would show an important progress as compared with the first one. This prospect has now become less certain on account of the war. We know that the events have prevented certain countries from taking the census or from working out, for the time being, the data already collected. As to other countries, we do not know whether and if so to what extent, present circumstances may have influenced their intention of acting upon the programme of the Institute.

Anyhow, it seems useful to show the elements available in the matter.

We give, in the first place, opposite to the name of each country data for which were published in the five volumes showing the returns of the First World Agricultural Census, the available information as to their joining in the second census.

COUNTRIES INCLUDED IN THE FIVE VOLUMES
OF THE FIRST WORLD AGRICULTURAL CENSUS
RETURNS

POSITION OF SAME COUNTRIES WITH RESPECT
TO THE SECOND WORLD AGRICULTURAL CENSUS

Europe.

1. - Austria The German census mentioned at No. 9 was extended also to the former Austrian territory.
2. - Belgium A census was taken from June 1st to June 15th, 1939. The working out of the collected data has been postponed on account of the circumstances.
3. - Czechoslovakia According to an official communication of December 1936, it had been decided to take a census in 1940. We do not whether and when the census of Bohemia-Moravia (Protectorate) and of Slovakia will be taken.

COUNTRIES INCLUDED IN THE FIVE VOLUMES
OF THE FIRST WORLD AGRICULTURAL CENSUS
RETURNSPOSITION OF SAME COUNTRIES WITH RESPECT
TO THE SECOND WORLD AGRICULTURAL CENSUS

4. - Denmark A census was taken on July 15th 1939.
5. - Estonia A census was taken between the end of June and the beginning of July 1939. The first returns appeared in the *Monthly Crop Report and Agricultural Statistics*, November 1939.
6. - Finland It has been decided to take the census in the autumn of 1940.
7. - France Preparations for the 1940 agricultural enquiry had begun, but then the work had to be suspended on account of circumstances.
8. - Germany A census was taken on May 17th, 1939. The first returns were published in the *Monthly Crop Report and Agricultural Statistics*, March and September 1940. Further returns will be given shortly.
9. - Greece It has been decided to take a census between January 10th and February 9th 1940.
10. - Ireland A census was taken on June 1st 1939.
11. - Italy According to the Census Act, a general agricultural census was expected to be taken in 1943. Steps having been taken in the matter by the Institute, it was hoped that it would be taken in 1941.
12. - Latvia A census was taken between June 26th and July 9th 1939. The first returns appeared in the *Monthly Crop Report and Agricultural Statistics* of April 1940.
13. - Lithuania A census was taken between the end of June and the beginning of July 1939.
14. - Netherland It had been decided to take the census in May 1940.
15. - Norway A census was taken on June 21st 1939. The first returns appeared in the *Monthly Crop Report and Agricultural Statistics*, September 1940.

COUNTRIES INCLUDED IN THE FIVE VOLUMES
OF THE FIRST WORLD AGRICULTURAL CENSUS
RETURNSPOSITION OF SAME COUNTRIES WITH RESPECT
TO THE SECOND WORLD AGRICULTURAL CENSUS

16. - Spain The Government has let us know that they intended joining in the census.
17. - Sweden An agricultural census was taken in 1937, and the next one will take place in 1942. We shall be able to use the data of the latter, just as we have used for the first census those of 1932.
18. - Switzerland A very complete and detailed census was taken on August 24th, 1939. Owing to circumstances, it is impossible to say now how soon the returns may be worked out.
19. - United Kingdom: England and Wales..... The yearly census was taken on June 3rd, 1939. Further complementary data were to be collected within a period of five years.
20. - United Kingdom: Scotland The yearly census was taken on June 3rd, 1939. Further complementary data were to be collected within a period of five years.
21. - United Kingdom: Northern Ireland No special measure has been taken, but it was expected that this country would supply the necessary data in due time, as it had done on the occasion of the first census.

America.

22. - Argentina..... At the time of the First World Agricultural Census there were available only the returns of a numbering of cattle taken on July 1st, 1930. For the second census a complete agricultural and pastoral census may be expected as under a recent law such a census will be taken yearly on September 30th.
23. - Canada Under an act existing in that country a census is to be taken on June 1st, 1941.
24. - Chile A census was taken on April 9th, 1936; no further one is expected to take place for the time being.
25. - Mexico..... A census was taken in March 1940.

COUNTRIES INCLUDED IN THE FIVE VOLUMES
OF THE FIRST WORLD AGRICULTURAL CENSUS
RETURNSPOSITION OF SAME COUNTRIES WITH RESPECT
TO THE SECOND WORLD AGRICULTURAL CENSUS

26. - Peru..... It is not known whether and, if so, to what extent that country will join in the Second World Agricultural Census.
27. - United States A census was taken on April 1st, 1940.
28. - Non-contiguous territories
of the United States ... A census was taken in 1940.
29. - Uruguay..... A census was taken in 1937, and the Government has promised to join in the best possible manner in the Second World Agricultural Census.

Asia.

30. - India Will join in the Second World Agricultural census to the same extent as it had done with regard to the first one.
31. - Japan Will contribute to the Second World Agricultural Census its yearly statistics.

Africa.

32. - Algeria Has promised to supply for the Second World Agricultural Census data drawn partly from its quinquennial agricultural enquiry and partly from its yearly agricultural statistics, in the same manner as for the first census.
33. - Egypt A census was arranged as to the 1939 crops.
34. - French West Africa It is not known whether and, if so, to what extent that country will join in the Second World Agricultural Census.
35. - Kenya A census was prepared for 1940. The list of questions drawn up for same has been sent to us.
36. - Mauritius No definite information has been received as to its joining in the Second World Agricultural Census.
37. - Mozambique Sent expressly to the Second Conference of Statistician Experts a delegate who took much interest in the census.

COUNTRIES INCLUDED IN THE FIVE VOLUMES
OF THE FIRST WORLD AGRICULTURAL CENSUS
RETURNSPOSITION OF SAME COUNTRIES WITH RESPECT
TO THE SECOND WORLD AGRICULTURAL CENSUS

38. - Union of South Africa ... An agricultural and pastoral census is taken every five years, more limited yearly numberings being taken in the intervals. The Government intended joining expressly in the Second World Agricultural Census, but awaited the setting out of the necessary funds by Parliament before taking a definitive decision in the matter.

Oceania.

39. - Commonwealth of Australia A yearly agricultural census is regularly taken. The Government intended joining in the Second World Agricultural Census.
40. - New Zealand A yearly agricultural census is regularly taken. The Government proposed to work out special tables for the Second World Agricultural Census.

(2) To the countries shown in the foregoing list we may add the following ones, which had not joined in the 1930 census, but have decided to take one in connection with the Second World Agricultural Census:

1. - Barbados A census was to be taken in 1941, but has been postponed until after the war.
2. - Brazil A detailed agricultural census was organised for September 1st, 1940.
3. - Bulgaria It has been decided to take a census in 1940.
4. - Colombia There has been done some preparatory work in connection with the census.
5. - Dominican Republic A census was taken on February 2nd 1940.
6. - Nicaragua A census was taken in April 1940.
7. - Romania A census was to be taken on December 1st 1940.
8. - Yugoslavia..... It has been decided to take a census in 1941.

(3) Other countries have let us know that they were not able to take a proper census, but have communicated to the Institute the data available in the matter as a contribution to the Second World Agricultural Census, or have declared themselves ready to do so.

To the first group belong the following countries: Antigua, Basutoland, Cyprus, Dominica, Gambia, Malta, Ruanda-Urundi, Saint Kitts and Nevis, British Somaliland. All the data supplied by these countries refer to the year 1939.

To the second group belong the following countries: Cape Verde, Belgian Congo, Gold Coast, Falkland Islands and Dependencies, Gilbert and Ellice, Grenada, British Guiana, Indochina, Jamaica, Java and Madura, Madagascar and dependencies, Montserrat and Dependencies, Nigeria, Nyasaland, Saint Vincent, Sierra Leone, Seychelles, Tonga, Tunis, Uganda.

IV. — Utilisation of the returns of the Census.

As has already been mentioned before, the war has exercised an unfavourable influence upon the census work. Certain countries were compelled to suspend or to postpone the census or to delay the working out of data already collected. In some cases, the publication of any statistical information of an economic character has been prohibited at present on account of the circumstances created by the war. The present condition of the means of communication and the difficulty met with in regularly corresponding with certain Governments do not allow us to know in some other cases whether the programmes which had been communicated to us have been realised in practice.

Possibly some countries which had to delay the taking of the census will be able to take it after the war, but it cannot be foreseen whether and when this may happen.

Thus there are at present many elements of doubt as to the portion of the world which will in fact be covered by the Second World Agricultural Census. Owing to such incertitude, it is difficult to draw up a complete plan for the definitive utilisation of the data which the census may supply. For the time being, it will prove most convenient to go on publishing in the *Monthly Crop Report and Agricultural Statistics* a summary of the principal returns which reach us, as soon as they become available.

Only when the amount of the collected data has substantially increased and the general situation cleared up, it will prove possible to judge whether—as we still like to hope—a general publication of such returns can be of any use.

Meanwhile, the Bureau of General Statistics will continue actively to deal with this part of its work and will do its best to complete its documentation, to maintain constant relations with all Governments which take an interest in the World Agricultural Census and to obtain from them all the collaboration the circumstances may allow for the success of an initiative to which the Institute has always attached the utmost importance, and still does so.

VEGETAL PRODUCTION

The following explanations refer to crop conditions quoted in the crop notes and in the tables. — Crop condition according to the system of the country: Germany, including Ostmark and Sudetenland, Bohemia and Moravia (Protectorate); Hungary and Luxemburg: 1 = excellent, 2 = good, 3 = average, 4 = poor, 5 = very poor; Finland: 8 = very good, 6 = above the average, 5 = average; France: 100 = excellent, 70 = good, 60 = fairly good, 50 = average, 30 = poor; Estonia, Latvia, Lithuania, Poland, Rumania and Sweden: 5 = excellent, 4 = good, 3 = average, 2 = poor, 1 = very poor; Netherlands: 90 = excellent, 70 = good, 60 = fairly good, 50 = below average; Portugal: 100 = excellent, 80 = good, 60 = average, 40 = poor, 20 = very poor; Switzerland: 100 = excellent, 90 = very good, 75 = good, 60 = fairly good, 50 = average, 40 = rather poor, 30 = poor, 10 = very poor; U. S. S. R.: 5 = good, 4 = above the average, 3 = average, 2 = below average, 1 = poor; Canada: 100 = crop condition promising a yield equivalent to the average yield of a long series of years; United States: 100 = crop condition which promises a normal yield; Egypt: 100 = crop condition which promises a yield equal to the average yield of the last five years. — For other countries the system of the Institute is employed: 100 = crop condition which promises a yield equal to the average of the last ten years.

NOTE: The countries are listed throughout by continents (Europe, followed by the U. S. S. R., America, Asia, Africa and Oceania) in the French alphabetical order. In the tables the Northern Hemisphere precedes the Southern Hemisphere.

THE 1940 WORLD WHEAT CROP AND THE CONDITION OF LAND UNDER WHEAT FOR THE 1941 HARVEST.

The 1940 Wheat Crop.

On December 16th the Argentine Government cabled to the Institute their first official estimate of the 1940/41 wheat crop, which is likely to prove much larger than was generally expected. Current estimates fluctuated around 200 million bushels; our own estimate, made last October for the preliminary calculation of the world crop was of about 220 million bushels, an amount we maintained unchanged in November. The official forecast points instead to a harvest of 294 million bushels, *i.e.* to an exceptionally large one, both in an absolute and in a relative sense. This crop would be one of the best ones ever had in that country, as it exceeds all former harvests with the exception of those of 1928 and 1938, which had produced respectively 349 and 336 million bushels. This result is the more remarkable as the area under wheat in Argentina is this year one of the smallest that have been ascertained in the last years, and as the conditions in which sowing and germination took place and vegetation first started were rather unsatisfactory. However, later on the season proved particularly favourable, especially in the important central part of the wheat region, so that the expected unit-yield appears to be the highest ascertained up to now. Since 1920, the maximum yield per acre sown has been registered in 1938/39 with 16.1 bushels; now, according to the first forecast, that of 1940/41 is likely to exceed this former maximum by about 5 per cent.

Argentina. — *Wheat.*

| YEARS | Area | | Production | Yield on area | |
|---------------------------|----------------|------------------|------------------|---------------|-----------|
| | sown | harvested | | sown | harvested |
| | thousand acres | thousand bushels | bushels per acre | | |
| Averages: | | | | | |
| 1923-24/1927-28 | 18,830 | 17,960 | 228,490 | 12.1 | 12.7 |
| 1928-29/1932-33 | 20,320 | 18,340 | 240,900 | 11.9 | 13.1 |
| 1933-34/1937-38 | 17,880 | 15,570 | 220,450 | 12.3 | 14.2 |
| Years: | | | | | |
| 1938-39 | 20,870 | 19,100 | 336,200 | 16.1 | 17.6 |
| 1939-40 | 17,830 | ... | 119,450 | 6.7 | ... |
| 1940-41 | 17,570 | ... | 293,940 | 17.7 | ... |

The present harvest follows the extremely poor 1939/40 crop, which again had been preceded by the great one of 1938-39. We may mention here that official statistics of exportable supplies of wheat have added about 28 million bushels to the stocks which existed in July 1940, without stating whether this supplementary amount comes from the 1939/40 harvest or represents an increase in the stocks carried over from the big 1938/39 crop. Anyhow, they show that either the 1939/40 crop, or the preceding one, or both of them, have been underestimated.

The marketing of the big 1940/41 crop will meet serious difficulties in Argentina. As the home consumption normally absorbs only about one third of the amount of wheat harvested this year, exportable stocks (including the former ones carried over to the present season) will reach about 230 million bushels. South America takes only about one fifth of this amount, while the rest is under normal circumstances almost wholly absorbed by Europe. Under the present circumstances, of all European importing countries, the British market remains practically alone open to Argentine wheat, but the length of the voyage and the competition of Canadian and Australian wheat are likely to prevent a large exportation to that country. The markets of other continents, although but of a modest importance, could slightly ease the heavy conditions of Argentine stocks, but reaching them would require many more ships than are available at present. In short, under present circumstances, and given the reduced import demand, it seems that the Argentine wheat surplus will have to be carried over to a large extent to the next 1941/42 season.

So far the Institute has not received any official estimate from the other big producing country of the Southern hemisphere, Australia, where the new crop is now being harvested. The various trade estimates which have been published of late point at a crop fluctuating around 110 million bushels. According to a news item which has appeared quite recently in the daily press, the Australian Government is said to have given a preliminary estimate of 92 million bushels;

thus wheat would give in 1940/41, upon a nearly average sown area (12.6 million acres), a unit-yield of 7.3 bushels per acre. Even if the season has been this year positively bad for wheat, especially on account of a heavy drought, a 92 million bushels estimate would appear to be too low and seems somewhat doubtful, although it bears an official stamp, the more so as it is confirmed that the rains which fell in October, the crucial month for Australian wheat culture, have proved beneficial in most of the more important wheat growing States. It was on account of these propitious rains that we thought it advisable to raise last month the estimate of the Australian 1940/41 crop to 130 million bushels as against 210 millions harvested in 1939/40 and 154 millions on the average in the five preceding years. Awaiting that new elements of fact clear up the matter, we maintain unchanged for the time being last month's forecast, although we admit that it might perhaps prove slightly overvalued. Anyhow, even with a much reduced crop, exportable stocks of Australian wheat will prove cumbersome in the present season, as export possibilities seem to be seriously limited by reason of the insufficient demand all over the world and of the difficult sea traffic with the distant countries which are the normal markets for Australian wheat. It is reckoned that the big 1939/40 harvest surplus has been but partly exported, and that on August 1st 1940 there were in the country stocks of about 120 million bushels of old wheat. With a home consumption of some 60 million bushels, the new crop, even should it prove a very poor one, will give a surplus of 40 to 50 million bushels, so that the total exportable Australian supplies would fluctuate in 1940/41 around 165 million bushels. During the last ten years, Australian wheat exports amounted on the average to 110 million bushels per year; in the present season, they will remain much below that average.

No important news as to the production of the countries of the Northern hemisphere has been communicated to the Institute in December save that cabled by the Washington Government on December 19th about the final results of the U. S. harvest. This item shows a marked improvement as compared with the preceding estimate of winter wheat, which passes from 556 to 589 million bushels, while that of spring wheat decreases from 236 to 228 millions. As compared with the former provisional estimate, there has been ascertained an increase of 24 million bushels. Without counting among the biggest crops of that country (record crops were those of 1,009 million bushels in 1915 and of 942 millions in 1931), the 817 million bushels U. S. crop is, however, a good one, exceeding by 9 per cent that of last year and by 14 per cent the former average. It widely exceeds the home requirements which are estimated this year at 685 million bushels, and, as the total exports of the campaign are set, on account of the lack of markets, at only 22 million bushels, almost all this surplus is likely to increase the already very heavy stocks carried over from the preceding campaign, which on July 1st 1940 reached already over 300 million bushels of wheat and flour. It seems probable that on July 1st 1941 these stocks will reach an amount of about 415 million bushels, nearly equal to the maximum recorded in 1932.

As to Canada, the final figures for the 1940 crop will be available next month.

Taking into account the last revised figures, the estimates of the 1940 crop in the various continents have increased by 24 million bushels in North America

and by 74 million in South America; the estimates of the other continents remaining unchanged, the world total increases by about 98 million bushels.

WHEAT. — *World Production by Continents.*

(in million bushels).

| PERIOD | North & Cent. America | South America | Europe (1) | Asia (2) | Africa | Oceania | Total (2) | U. S. S. R. |
|---------------------------|-----------------------------|------------------|---------------|-------------|--------|---------|--------------|-------------|
| Averages: | | | | | | | | |
| 1909-13 | 900 | 180 | 1,360 | 490 | 102 | 98 | 3,130 | 757 |
| 1923-27 | 1,210 | 278 | 1,244 | 497 | 108 | 143 | 3,480 | 677 |
| 1928-32 | 1,288 | 290 | 1,429 | 536 | 128 | 189 | 3,860 | 797 |
| 1933-37 | 901 | 280 | 1,580 | 580 | 133 | 166 | 3,640 | 1,206 |
| Year: | | | | | | | | |
| 1938 | 1,304 | 400 | 1,822 | 680 | 140 | 162 | 4,508 | 1,494 |
| 1939 | 1,260 | 176 | 1,705 | 694 | 169 | 220 | 4,224 | ... |
| 1940 (forecast) | 1,377 | 350 | 1,396 | 730 | 147 | 140 | 4,140 | ... |

(1) Excluding the U. S. S. R. — (2) Excluding U. S. S. R., China, Iraq and Iran.

In short, it can be said that, according to the recent information mentioned above, the 1940 wheat crop appears to be excellent in North America and in Asia, good in South America and in Africa, and bad in Europe and in Australasia. For the world taken on the whole (with the exception of the Soviet Union and of China) the crop may be said a good average one: while it remains by 2 per cent below that of last year and by 8 per cent below the very big one of 1938, it notably exceeds all the former averages, viz. by 14 per cent the average for 1933-1937, by 7 per cent that of 1928-1932 and by 19 per cent that of 1923-1927.

The condition of the Wheat sowings for the 1941 Crop.

Information which has reached the Institute up to the middle of December, although incomplete, allows to foresee that, generally speaking, the sowing of winter cereals for the 1941 crop went on under rather favourable circumstances, as a mild season and frequent rains favoured it almost everywhere. Yet in some parts, as in Hungary, rains were excessive and delayed, sometimes to a large extent, the sowing work; in various places, an insufficiency of hands and of pulling animals was lamented as well. Wherever the sowing had been done in due time, the germination on the sown fields was regular and the development of the crops on the whole satisfactory, although in some flat parts fields suffered from excessive rains and sometimes even from floods. On the whole, the season has not presented in Europe any particularly serious drawbacks, and it is to be believed that the condition of the area under wheat is satisfactory in most countries. It is confirmed that no pains were spared to extend everywhere the winter cultivation of bread cereals in order to assure as far as possible the home food supply;

thus, for the whole of European countries, there is assumed a much larger cultivated area than that of last year.

In the Soviet Union, there is noted as well an increase of the area under winter cereals. The autumn, although characterised by particularly marked meteorological changes, favoured a rapid development of the cultures and a vigorous sprouting; it is even feared that the development of the plants has been excessive, so as to create a risk of diminishing the possibilities of resistance to the rigours of winter in the zones which are more exposed to the inclemencies of the weather.

In the United States, the beginning of autumn was very favourable to agricultural work and to sowing, as frequent and copious rains covered almost the whole zone under winter cereals. Thus the vegetation had a very good start. About the middle of autumn, the weather became dry once more in a large part of the country, and the conditions of the fields, while keeping on the whole favourable, gave occasion to some complaints, especially in Texas, in the western part of Oklahoma and in the centre of Nebraska. The Washington Government cabled to the Institute on December 20th that the condition of the crops at the beginning of the month was one of the best ones of the last years. According to the same cable, the estimated area under winter wheat shows for the whole of the United States an increase of 5.6 per cent as compared with last year, but remains still by 10 per cent below the preceding quinquennial average. Data about the cultivated areas and the condition of the cultures on the first day of December in each of the years from 1929 to 1940 are shown in the following table.

United States. — *Winter Wheat.*

| Autumn | Area sown in thousand acres | Crop condition at December 1 |
|----------------|--------------------------------|---------------------------------|
| 1940 | 46,271 | 84 |
| 1939 | 43,820 | 55 |
| 1938 | 46,364 | 72 |
| 1937 | 56,539 | 76 |
| 1936 | 57,656 | 76 |
| 1935 | 49,765 | 78 |
| 1934 | 47,064 | 78 |
| 1933 | 44,585 | 74 |
| 1932 | 44,445 | 69 |
| 1931 | 43,371 | 79 |
| 1930 | 45,647 | 86 |
| 1929 | 45,032 | 86 |

In Egypt, sowing was proceeded with under favourable circumstances; the areas under cereals were increasing.

G. CAPONE.

CURRENT INFORMATION FROM VARIOUS COUNTRIES ON WHEAT, RYE, BARLEY AND OATS.

Bulgaria: Owing to a poor wheat crop, the Bulgarian Government had decided that beginning December 15, flour for bread-making must contain 50 per cent. of maize.

Spain: The weather has been generally favourable to the sowing of winter cereals. Rains were quite abundant in some regions, and here and there have caused some damage. The scarcity of draft animals and fertilizers has caused some difficulty to the development of seeds.

Hungary: During the period from November 17 to December 14, the weather was not favourable to plowing and sowing operations. Floods and the excessive wetness of the soil caused damages to the seeds of winter cereals.

Early seedings germinated well, and are bushy and of a fine green colour. Late seedings however have germinated very slowly and in some places they are not out yet.

In most of the districts, the area sown to winter cereals this year is from 15 to 30 per cent. less than in the preceding years. In five districts the reduction is of from 30 to 60 per cent.

Ireland: The outturn of wheat seems to have exceeded the large 1939 crop.

Romania: During the second part of November, the weather was favourable to plowing and to the seeding of winter cereals. The grave danger which had threatened agriculture in Romania with serious difficulties to the completion of the sowing of winter cereals on account of bad weather, was happily avoided both owing to a favourable turn in the weather conditions and to the efforts of the farmers and of the administration. At November 20, the area sown to winter cereals was 4,448,000 acres, i. e., about 80 per cent. of the plan. In a number of districts, the sowing plan was realized in full. At November 27, 4,942,000 acres had already been seeded, and it was reasonably hoped that the figures of 5,684,000 acres could be attained. At November 30, the situation of sowings as compared with the plan, was as follows:

| | Plan of sowings Acres | Area sown at Nov. 30 Acres | % of the sown area as compared with the plan |
|-------------------------|-----------------------------|----------------------------------|---|
| Winter wheat | 5,659,000 | 5,419,000 | 95.8 |
| Winter rye | 280,000 | 175,000 | 62.5 |
| Winter barley | 157,000 | 50,000 | 32.0 |
| Total | 6,096,000 | 5,644,000 | 92.6 |

If the fact is taken into consideration that by November 30 seedings were continued, it may be concluded that the sowing of winter cereals was effectuated nearly in full. This means that the area sown to winter cereals is at least 20 per cent. larger than that sown last year on the same territory.

As customary, in Romania very little spring rye is being sown. Probably the deficit of the area to winter rye will not be made up for by the sowing of the same cereal in the spring. By way of compensation, as winter barley is of secondary importance in Romanian agriculture, the sowings of spring barley will certainly make up for the small area sown to winter barley.

In Dobrougja the plan could not be fully filled on account of the lack of labour and draft animals. In northern Moldavia too the situation is not altogether satisfactory.

While full satisfaction is expressed in regard to the area sown, some worry is being caused by the fact that most of the sowing was done late. About December 10, cold weather and snow stopped all Autumn sowings and plowing. Weather conditions were favourable to early sowings and the seeds are well developed.

Areas under cereals.

| COUNTRIES | 1940 | | | % 1940 | | 1940 | | | % 1940 | |
|-------------------------------|-----------|-----------|----------------------------|---------------|------------------|-----------|-----------|----------------------------|---------------|------------------|
| | 1940 | 1939 | Average 1934 to 1938 | 1939 = 100 | Average = 100 | 1940 | 1939 | Average 1934 to 1938 | 1939 = 100 | Average = 100 |
| | | | | | | | | | | |
| | WHEAT | | | | | RYE | | | | |
| Finland | (1) 303 | (1) 336 | (2) 222 | 90.1 | — | (1) 490 | (1) 539 | (2) 592 | 91.1 | — |
| Greece | 2,599 | 2,356 | 2,072 | 110.3 | 125.4 | 163 | 156 | 170 | 104.6 | 96.2 |
| Hungary | (4) 4,313 | (4) 4,626 | (5) 3,926 | — | — | (3) 1,624 | (4) 1,718 | (5) 1,558 | — | — |
| Ireland | 310 | 255 | 192 | 121.4 | 161.0 | — | — | — | — | — |
| Luxembourg | 35 | 38 | 45 | 91.1 | 76.2 | 16 | 18 | 18 | 89.8 | 89.2 |
| Romania | (6) 4,564 | 10,079 | 8,560 | — | — | (6) 426 | 1,107 | 1,037 | — | — |
| Sweden | 764 | 828 | 716 | 92.2 | 106.6 | 426 | 463 | 539 | 92.0 | 78.9 |
| Yugoslavia | * 4,695 | 5,585 | 5,392 | 84.1 | 87.1 | — | — | — | — | — |
| U. S. S. R.: Lithuania . . | (1) 498 | (1) 512 | (2) 512 | 97.1 | — | (1) 1,428 | (1) 1,410 | (2) 1,255 | 101.3 | — |
| Canada { w } | 775 | 735 | 590 | 105.5 | 131.4 | 786 | 891 | 565 | 88.2 | 139.2 |
| { s } | 27,951 | 26,021 | 24,451 | 107.4 | 114.3 | 249 | 211 | 168 | 118.0 | 147.9 |
| United States { w } | 36,147 | 38,078 | 40,498 | 94.9 | 89.3 | 3,192 | 3,832 | 3,363 | 83.3 | 94.9 |
| { s } | 17,356 | 15,404 | 15,158 | 112.7 | 114.5 | | | | | |
| India | 33,666 | 34,941 | 34,585 | 96.4 | 97.3 | — | — | — | — | — |
| Japan | 2,064 | 1,823 | 1,691 | 113.2 | 122.0 | — | — | — | — | — |
| Manchukuo | 2,518 | 3,188 | 2,677 | 79.0 | 94.1 | — | — | — | — | — |
| Egypt | 1,563 | 1,501 | 1,452 | 104.1 | 107.6 | — | — | — | — | — |
| Argentina (7) | 17,569 | 17,833 | 18,473 | 98.5 | 95.1 | 2,751 | 2,296 | 2,105 | 119.8 | 130.7 |
| Australia | 12,600 | 13,300 | 12,980 | 94.7 | 97.1 | — | — | — | — | — |
| | BARLEY | | | | | OATS | | | | |
| Finland | (1) 281 | (1) 294 | (2) 311 | 95.6 | — | (1) 1,066 | (1) 1,166 | (2) 1,143 | 91.3 | — |
| Greece | 554 | 532 | 511 | 104.2 | 108.6 | 434 | 373 | 339 | 116.3 | 128.0 |
| Hungary | (3) 1,300 | (4) 1,321 | (5) 1,135 | — | — | (3) 793 | (4) 633 | (5) 542 | — | — |
| Romania | (6) 1,604 | 2,708 | 3,857 | — | — | (4) 1,406 | 1,455 | 1,910 | — | — |
| Sweden | 264 | 280 | 258 | 94.6 | 102.3 | 1,574 | 1,647 | 1,647 | 95.6 | 95.6 |
| U. S. S. R.: Lithuania . . | (1) 558 | (1) 550 | (2) 521 | 101.6 | — | (1) 944 | (1) 941 | (2) 858 | 100.4 | — |
| Canada | 4,342 | 4,347 | 4,144 | 99.9 | 104.8 | 12,298 | 12,790 | 13,435 | 96.2 | 91.5 |
| United States | 13,394 | 12,644 | 9,555 | 105.9 | 140.2 | 34,847 | 32,968 | 34,715 | 105.7 | 100.4 |
| Japan | 1,848 | 1,879 | 1,887 | 98.3 | 97.9 | — | — | — | — | — |
| Egypt | 278 | 273 | 280 | 101.9 | 99.2 | — | — | — | — | — |
| Argentina (7) | 2,139 | 2,122 | 1,975 | 100.8 | 108.3 | 3,899 | 3,446 | 3,251 | 113.1 | 119.9 |

w) Winter crops. — s) Spring crops. — * Unofficial approximate estimate. — (1) Present territory. — (2) Former territory. — (3) Including the reannexed northern zone and Sub-Carpathia. — (4) Including the reannexed northern zone but excluding Sub-Carpathia. — (5) Territory as at the end of 1937. — (6) Not including Bessarabia and Northern Bucovina. — (7) Areas sown for the 1940-41 crop.

United Kingdom: According to the Department of Agriculture of the United States the outturn of wheat in 1940 is placed above that in 1939 as a result of increased acreage, average yield per acre being estimated at 18.9 centals (31.5 bushels) compared with 20.7 centals (34.5 bushels) in 1939. Growing conditions in Scotland and Northern Ireland are reported to have been generally favorable for wheat and a good crop is indicated.

Yugoslavia: At the beginning of December no official estimate of the wheat crop had been published. Only uncomplete official data of the wheat production of the whole country, except the banovine of Croatia, have been made known. According to this estimate, the wheat crop of the country, except the banovine of Croatia, amounted to 34.2 million centals (56.9 million bushels). By adding to that figure 6.7 million centals (11.8 million bushels) which represent the probable production of the banovine of Croatia, a total of 41.9 million centals (69.8 million bushels) is attained this year, as against 66.1 million centals (88.1 million bushels) last year. This high deficit in the wheat production has obliged the Government to issue a decree, under the date of December 1940, whereby, beginning January 1, 1941, bread will be made with flour containing 70 per cent. wheat and 30 per cent. maize. By this measure it is hoped that the bread home needs will be filled up to the time of the new harvest. The banovine of Croatia, owing to its low wheat production, has applied this measure in advance and has obliged the bakers of Zagreb to prepare bread with flour mixed with a higher proportion of maize flour, beginning December 10 (60 per cent. wheat flour and 40 per cent. maize). The price of bread, according to this decision, must remain unchanged.

The weather during the month of November was rather mild, but cloudy and rainy in the northwest, and fairer along the littoral and in the southern part of the country. The average minimum temperature did not go below -3° . Snow fell seldom in the plains: only about the tenth and the last week in November, when it reached from between -5° and -8° . The average maximum temperature varied from between $+17^{\circ}$ and $+24^{\circ}$. These weather conditions were generally favourable to sowings of winter wheat. Preliminary information shows that the area sown this autumn to winter wheat is about 10 per cent. greater than last year. At the beginning of December the condition of the culture of winter wheat was good.

U. R. S. S.: It can be said that the threshing of cereals was over by the beginning of December, with the exception of cereals gathered on 2.3 per cent. of areas harvested this year, which had still to be threshed. At the same date last year the amount still to be threshed was 6.2 per cent.

Strong sudden changes all over the country characterized weather conditions this year. Warm and rainy in September, the weather turned to abnormally cold in October. Cold weather prevailed also at the beginning of November, with temperatures falling from 28 to 23 degrees Fahrenheit, even in the southern regions. In all the northern and central sections of the European territory, as far as the northern frontiers of Ukraine, the fields were covered with snow. In the second decade of November, temperatures were generally very high, reaching from 7 to 14 degrees above the normal. About the middle of November there was an exceptional warm wave. In the central and western regions from 46 to 54 degrees were registered, and in Ukraine and Caucasus the temperature went as high as from 59 to 68 degrees. Snow had disappeared, and the line of demarcation stretching northward, nearly reached Vologda and Kirov. The soil was free from ice. With the increase of the temperature, in the northern regions cloudy weather prevailed, heavy rains fell accompanied sometimes by snow. The damp reserves of the soil increased heavily. In the southern regions, during the same period, rains were scarce and in some sections of the south-east they even lacked altogether. In the regions of the central zones of the Black Lands and White Russia the vegetation of seeds had started again. In the western part of Siberia the temperature was above normal, though largely below freezing-point, while in the eastern zone the cold was intense. In the whole of Siberia the fields are covered with snow (8 to 18 inches), and the seedlings are well protected against low temperatures.

In Central Asia and Transcaucasia the weather was warm, and temperature reached a maximum from 68° to 77° .

Cereal Production.

| COUNTRIES AND PRODUCTS | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | % 1940 | |
|----------------------------|------------------|------------|----------------------------|------------------|-------------|----------------------------|---------------|------------------|
| | | | | | | | 1939 = 100 | Average = 100 |
| | Thousand centals | | | Thousand bushels | | | | |
| WHEAT | | | | | | | | |
| Spain | * 72,753 | 63,447 | (1) 93,264 | * 121,252 | 105,742 | (1) 155,437 | 114.7 | 78.0 |
| Finland | (2) 3,594 | (2) 5,102 | (3) 3,581 | (2) 5,989 | (2) 8,503 | (3) 5,968 | 70.4 | — |
| Greece | 20,503 | 22,975 | 16,616 | 34,171 | 38,291 | 27,693 | 89.2 | 123.4 |
| Hungary | (4) 45,581 | (5) 67,862 | (6) 48,933 | (2) 75,966 | (5) 113,102 | (6) 81,554 | — | — |
| Italy | 160,938 | 175,929 | 160,487 | 268,225 | 293,210 | 267,474 | 91.5 | 100.3 |
| Norway | 1,558 | 1,716 | 1,236 | 2,597 | 2,860 | 2,060 | 90.8 | 126.1 |
| Romania | (7) 36,402 | 98,169 | 74,044 | (7) 60,669 | 163,611 | 123,404 | — | — |
| Slovakia | 7,527 | 8,400 | — | 12,546 | 13,999 | — | 89.6 | — |
| Sweden | 10,020 | 18,831 | 15,475 | 16,700 | 31,384 | 25,791 | 53.2 | 64.8 |
| Yugoslavia | * 43,652 | 63,397 | 53,571 | * 72,751 | 105,659 | 89,283 | 68.9 | 81.5 |
| U.S.S.R.:Estonia | 1,676 | 1,880 | 1,648 | 2,792 | 3,133 | 2,746 | 89.1 | 101.7 |
| Canada | {(w) 13,678 | 13,363 | 8,437 | 22,797 | 22,271 | 14,061 | 102.4 | 162.1 |
| United States | {(s) 314,629 | 280,411 | 149,630 | 524,382 | 467,352 | 249,383 | 112.2 | 210.3 |
| Mexico | {(w) 353,491 | 341,845 | 335,654 | 589,151 | 569,741 | 559,423 | 103.4 | 105.3 |
| India (8) | {(s) 136,528 | 109,016 | 94,772 | 227,547 | 181,694 | 157,954 | 125.2 | 144.1 |
| Japan | 7,740 | 8,863 | 6,932 | 12,900 | 14,771 | 11,553 | 87.3 | 111.7 |
| Manchukuo | 241,560 | 222,365 | 219,740 | 402,600 | 370,608 | 366,227 | 108.6 | 109.9 |
| Turkey | 39,682 | 36,652 | 28,467 | 66,135 | 61,086 | 47,445 | 108.3 | 139.4 |
| Egypt | 19,354 | 20,852 | 20,816 | 32,257 | 34,753 | 34,693 | 92.8 | 93.0 |
| French Morocco | 114,641 | 101,587 | 75,101 | 191,064 | 169,309 | 125,165 | 112.8 | 152.6 |
| Argentina | 30,004 | 29,406 | 26,102 | 50,006 | 49,009 | 43,502 | 102.0 | 115.0 |
| | 14,400 | 23,280 | 13,911 | 24,000 | 38,800 | 23,184 | 61.9 | 103.5 |
| | 176 370 | 71,673 | 138,367 | 293,945 | 119,452 | 230,607 | 246.1 | 127.5 |
| RYE | | | | | | | | |
| Spain | * 15,432 | 9,045 | (1) 10,981 | * 27,558 | 16,152 | (1) 19,608 | 170.6 | 140.5 |
| Finland | (2) 5,930 | (2) 6,736 | (3) 8,168 | (2) 10,590 | (2) 12,029 | (3) 14,586 | 88.0 | — |
| Greece | 1,275 | 1,376 | 1,248 | 2,278 | 2,457 | 2,229 | 92.7 | 102.2 |
| Hungary | (4) 15,964 | (5) 19,042 | (6) 15,361 | (4) 28,507 | (5) 34,004 | (6) 27,430 | — | — |
| Norway | 126 | 136 | 244 | 224 | 242 | 436 | 92.6 | 51.5 |
| Romania | (7) 3,803 | 9,513 | 8,625 | (5) 6,791 | 16,987 | 15,401 | — | — |
| Slovakia | 4,991 | 4,894 | — | 8,912 | 8,740 | — | 102.0 | — |
| Sweden | 6,528 | 8,340 | 9,327 | 11,657 | 14,894 | 16,655 | 78.3 | 70.0 |
| U.S.S.R.:Estonia | 4,211 | 5,019 | 4,216 | 7,519 | 8,963 | 7,528 | 83.9 | 99.9 |
| Canada | {(w) 5,912 | 6,820 | 3,065 | 10,557 | 12,178 | 5,473 | 86.7 | 192.9 |
| United States | {(s) 2,093 | 1,752 | 894 | 3,737 | 3,129 | 1,597 | 119.4 | 234.0 |
| Turkey | 22,736 | 21,867 | 23,115 | 40,600 | 39,049 | 41,276 | 104.0 | 98.4 |
| Argentina | 11,314 | 9,396 | 7,579 | 20,314 | 16,779 | 13,534 | 121.1 | 150.1 |
| | 10,582 | 7,606 | 4,872 | 18,897 | 13,582 | 8,700 | 139.1 | 217.2 |
| BARLEY | | | | | | | | |
| Spain | * 44,093 | 31,048 | (1) 48,808 | * 91,861 | 64,685 | (1) 101,684 | 142.0 | 90.3 |
| Finland | (2) 3,395 | (2) 4,156 | (3) 4,158 | (2) 7,073 | (2) 8,658 | (3) 8,663 | 81.7 | — |
| Greece | 5,280 | 4,877 | 4,336 | 11,001 | 10,160 | 9,034 | 108.3 | 121.8 |
| Hungary | (4) 15,280 | (5) 17,407 | (6) 13,402 | (4) 31,834 | (5) 36,265 | (6) 27,922 | — | — |
| Norway | 2,016 | 2,281 | 2,678 | 4,200 | 4,753 | 5,578 | 88.4 | 75.3 |
| Romania | (7) 14,674 | 17,999 | 22,736 | (5) 30,572 | 37,498 | 47,367 | — | — |
| Slovakia | 6,028 | 5,864 | — | 12,559 | 12,218 | — | 102.8 | — |
| Sweden | 4,246 | 5,517 | 4,895 | 8,846 | 11,494 | 10,198 | 77.0 | 86.7 |
| U.S.S.R.:Estonia | 1,830 | 1,985 | 2,077 | 3,812 | 4,136 | 4,328 | 92.2 | 88.1 |
| Canada | 50,618 | 49,511 | 38,880 | 105,454 | 103,147 | 81,001 | 102.2 | 130.2 |
| United States | 148,433 | 131,888 | 98,233 | 309,235 | 274,767 | 204,652 | 112.5 | 151.1 |
| Japan | 37,198 | 39,200 | 34,300 | 77,498 | 81,669 | 71,460 | 94.9 | 108.4 |
| Turkey | 58,423 | 50,601 | 43,218 | 121,716 | 105,420 | 90,040 | 115.5 | 135.2 |
| Egypt | 5,315 | 5,251 | 4,951 | 11,073 | 10,939 | 10,316 | 101.2 | 107.3 |
| Argentina | 18,960 | 18,764 | 12,462 | 39,500 | 39,092 | 25,962 | 101.0 | 152.1 |

| COUNTRIES AND PRODUCTS | 1940 | | | 1939 | | | Average 1934 to 1938 | | | 1940 | | | 1939 | | | Average 1934 to 1938 | | | % 1940 | |
|---------------------------|----------------|---------|-----|------------------|---------|-------|----------------------------|--------|-----|------------------|--------|---------|------------------|---------|--------|----------------------------|-------|-------|------------------|-------|
| | Thousand cents | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | 1939 = 100 | |
| | Thousand cents | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Thousand bushels | | | Average = 100 | |
| OATS | | | | | | | | | | | | | | | | | | | | |
| Greece. | | 3,840 | | | 3,343 | | | 2,479 | | | 12,001 | | | 10,447 | | | 7,748 | | 114.9 | 154.9 |
| Finland. | (2) | 13,140 | | (2) | 16,935 | (3) | 16,010 | | | (2) | 41,061 | (2) | 52,922 | (3) | 50,030 | | 77.6 | | — | — |
| Hungary. | (4) | 9,575 | (5) | 8,067 | (6) | 5,944 | (4) | 29,921 | (5) | 25,209 | (6) | 18,574 | | 12,603 | | 80.3 | | 88.1 | | |
| Norway. | | 3,553 | | | 4,427 | | 4,033 | | | | 11,103 | | 13,833 | | 12,603 | | — | | — | — |
| Romania. | (7) | 10,032 | | | 10,736 | | 13,140 | | (5) | 31,349 | | 33,548 | | 41,061 | | 121.9 | | — | | — |
| Slovakia. | | 4,192 | | | 3,439 | | — | | | 13,100 | | 10,747 | | — | | 88.2 | | 89.7 | | |
| Sweden. | | 24,998 | | | 28,328 | | 27,854 | | | 78,119 | | 88,526 | | 87,042 | | 99.0 | | 102.3 | | |
| U.S.S.R.:Estonia | | 3,263 | | | 3,295 | | 3,190 | | | 10,196 | | 10,296 | | 9,968 | | 100.9 | | 119.2 | | |
| Canada. | | 131,853 | | | 130,698 | | 110,641 | | | 412,040 | | 408,432 | | 345,752 | | 132.0 | | 130.0 | | |
| United States. | | 395,401 | | | 299,501 | | 304,176 | | | 1,235,628 | | 935,942 | | 950,551 | | 120.5 | | 162.1 | | |
| Turkey. | | 7,848 | | | 6,512 | | 4,842 | | | 24,526 | | 20,351 | | 15,132 | | 100.8 | | 121.1 | | |
| Argentina. | | 19,401 | | | 19,238 | | 16,016 | | | 60,627 | | 60,117 | | 50,048 | | | | | | |

(w) Winter crop. — (s) Spring crop. — * Unofficial estimate.

(1) Average 1934 to 1936. — (2) Present territory. — (3) Former territory. — (4) Including the reannexed northern zone and Sub-Carpathia. — (5) Including the reannexed northern zone but excluding Sub-Carpathia. — (6) Territory as at the end of 1937. — (7) Not including Bessarabia and Northern Bucovina. — (8) Final estimate.

The trend of weather conditions during the Fall has created a peculiar situation as regards the development of winter crops in the country. The warm and rainy weather of September had favoured a quick development of the seedlings, especially of rye. Insufficient insulation during the period of growth caused an excessive development of the plants, which, in some cases, grew to from 16 to 20 inches. An excessive development of seedlings may, under certain circumstances, considerably weaken their resistance to low temperatures during the winter. A serious danger might be represented by a snowfall on the unfrozen soil, which (with the exception of the Volga regions) is exceptionally saturated with water. Such conditions, in the case of thick and strongly developed stalks, might cause the suffocation of young plants. Owing to the territorial distribution of winter cereals in the country, rye, which is grown chiefly in regions where snow is generally very thick, is more exposed to damages than wheat, which is cultivated mostly in the southeastern sections where the danger for winter crops comes generally from an insufficient snow protection. In order to avoid this danger, the authorities insist on the methodical execution of certain appropriate measures in the different zones. These measures are dictated primarily by the snow regime on the fields during the winter and the beginning of spring.

At December 1, the areas sown to winter cereals amounted to 92,154,000 acres, i. e., 7 per cent. above the figure foreseen by the plan. At the same date last year, the areas sown amounted to 87,929,000 acres, i. e., 97.3 per cent. of the plan. It must be remarked however that these figures deal with areas sown in the collective and State exploitations, and do not include private undertakings which however are not of any great importance. Consequently nearly the whole of the territories recently incorporated in the Soviet Union are not included in these figures, with the exception however, of some so far not very important areas belonging to the collective and State exploitations recently organized in some of the incorporated territories. Owing to the favourable mild autumn weather preparatory work for spring are being made this year very quickly, and at December 1, they had been effectuated over 115,523,000 acres, i. e., 69.8

per cent. of the amount fixed by the plan. The corresponding figures last year were 91,126,000 acres, i. e., 55 per cent. of the plan.

Argentina: According to the preliminary estimate of the Argentine Government, cabled on 13 December, the 1940-41 wheat season (see Cereals Table) has yielded the highest amount ever registered so far in the country, with the exception of the top productions of 1928-29 and 1938-39. This production is by 146.1 per cent. higher than the very low one of 1939-40, and by 27.5 per cent. above the average of the five preceding years. The production of the present season is spread over an area which is 1.5 per cent. less than that of 1939-40 and 5 per cent. below the average. The high yield of this year's production is due to particularly favourable weather, especially in the latest months.

United States: The Crop Reporting Board of the United States Department of Agriculture, in a report released on December 21, estimated the area sown to winter wheat in the autumn of 1940 at 46,271,000 acres, an increase of 5.6 per cent. from the area sown last year, now estimated at 43,820,000 acres and a decrease of 10.1 per cent. from the average of the preceding five years (51,478,000 acres). Crop condition on December 1 was 84 per cent. of the normal against 55 on December 1, 1939.

The rye area is estimated at 6,002,000 acres against 5,536,000 acres last year and a five-year average of 6,002,000 acres; percentages, 108.4 and 88.1. Crop condition on December 1 was 83 per cent. of the normal against 64 on December 1 last year. The rye estimates relate to the total seeded acreage of rye for all purposes, including an allowance for spring-sown rye.

Egypt: At the beginning of November the preparation of the soil for the culture of wheat was being actively pushed. Some areas had already been sown. Barley was also being sown at the same time. The germination of these two cereals was satisfactory. It is estimated that the areas sown to wheat and barley are greater than last year.

CURRENT INFORMATION ON MAIZE.

Bulgaria: The good maize crop this year will entirely cover the deficit of the wheat production.

Hungary: On 21 November, the Hungarian Government published a statistical abstract independently of the ordinary program of the statistical service, dealing with maize production and indicating the share of maize which has not reached maturation. Out of 34 departments or administrative units (not including Northern Transylvania) there is only one which does not register maize which did not reach the ripening stage. Thirteen departments or units register a share-part of 3-10 per cent. of unripened maize, eleven departments register from 10 to 20 per cent., and seven from 20 to 30 per cent. In one department the share part of unripened maize reached 40 per cent. of the production, and in one administrative unit of Sub-Carpathia the share part was 50 per cent. For the whole country, not including Northern Transylvania, out of 65,200,000 centals (117,000,000 bushels) that is the whole maize production, 850,000 centals (15,350,000 bushels), i. e., 13.2 per cent. did not mature.

Portugal: Production in the most important maize producing regions (Braga, Viscu and Porto), appears quite abundant. The total production of maize is good.

Romania: Owing to favourable weather in Autumn, the harvesting of the maize crop was completed under good conditions. Up to December 1, drying progressed well. The production has been generally abundant.

Production of maize.

| COUNTRIES | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | % of 1940 | |
|----------------------------------|------------------------|------------------------|----------------------------|-------------------------|------------------------|----------------------------|---------------|------------------|
| | 1,000 centals | | | 1,000 bushels of 56 lb. | | | 1939 = 100 | Average = 100 |
| | | | | | | | | |
| United States | 1,371,552 | 1,457,194 | 1,174,369 | 2,449,200 | 2,602,133 | 2,097,088 | 94.1 | 116.8 |
| Canada | 3,802 | 4,534 | 3,780 | 6,789 | 8,097 | 6,750 | 83.8 | 100.6 |
| Romania ⁽¹⁾ | 88,384 | ⁽²⁾ 113,685 | ⁽³⁾ 91,497 | 157,828 | ⁽⁴⁾ 203,010 | ⁽⁵⁾ 163,387 | 77.7 | 96.6 |
| Yugoslavia | ^(*) 110,231 | 89,191 | 103,418 | ^(*) 196,842 | 159,269 | 184,676 | 123.6 | 106.6 |
| Hungary | ^(*) 65,345 | ^(*) 51,468 | ^(*) 50,840 | ^(*) 116,688 | ^(*) 91,907 | ^(*) 90,787 | — | — |
| Bulgaria | ... | 19,621 | 17,910 | ... | 35,038 | 31,981 | ... | ... |
| Italy | ^(*) 70,560 | 49,994 | 60,099 | 126,000 | 89,274 | 107,320 | 141.1 | 117.4 |
| | ^(*) ... | ... | 6,523 | ... | ... | 11,649 | ... | ... |
| Manchukuo | 75,103 | 54,234 | 44,198 | 134,113 | 96,847 | 78,926 | 138.5 | 169.9 |
| Turkey | 16,050 | 15,744 | 12,309 | 28,660 | 28,114 | 21,980 | 101.9 | 130.4 |

(1) Not including Bessarabia and northern Bukovina. — (2) Approximate unofficial data. — (3) Including the reannexed northern zone and Sub-Carpathia without northern Transylvania. — (4) Including the reannexed northern zone without Sub-Carpathia and northern Transylvania. — (5) Hungarian territory at the end of 1937. (*) Maize sown in spring. — † Maize sown in summer.

Yugoslavia: Very recent information from various unofficial sources confirm that the production of maize has been exceptionally high. According to these estimates the 1940 maize crop should not be less than 110 million centals (197 million bushels), and it might even reach 132 million centals (236 million bushels). While awaiting the official estimate, it may be figured that the crop may be about 121 million centals (217 million bushels). Out of this amount, nearly 77 million centals (138 million bushels) will be needed for home consumption, and 22 million centals (39 million bushels) to cover the wheat deficit; so that the country will have available for export only 22 million centals (39 million bushels).

Notwithstanding this high production, the prices of maize continued to go up during the month of November, following the price increase of wheat and other cereals. In order to check this tendency, at the end of November the Government issued a decree fixing a maximum price for maize. By that decree, the price of a 100 kilograms of yellow maize, containing up to 14 per cent. humidity, must not be higher than 250 dinars. The price of yellow maize containing up to 26-28 per cent. humidity, cannot be higher than 200 dinars. These prices are binding for all producers.

U. S. S. S.: Owing to late ripening and to rains during autumn, the quantity of humidity contained in the maize grains is above normal.

CURRENT INFORMATION ON RICE.

Bulgaria: The blowing of the dry and warm wind called "Tshalgar" during the ripening period, dried up a large amount of rice grains. According to official information, the rice production this year appears very weak.

Consequently higher prices on the rice market are expected.

Spain: According to press information, the rice crop amounted this year to 5.3 million centals (11.8 million bushels) as against 3.3 million centals (7.3 million bushels) in 1939.

Italy: The production of rice in 1940 is estimated at 18,535,000 centals (41,185,000 bushels) against 16,805,000 centals (37,345,000 bushels) in 1939 and an average of 16,535,000 centals (36,745,000) bushels in 1934 to 1938; percentages, 110.3 and 112.1.

Portugal: It is known that among the most important rice producing provinces, Setubal and Coimbra have registered very good yields. The total production of rice is considered good.

United States: According to the most recent estimate the area cultivated to rice this year is about 1,051,000 acres against 1,040,000 in 1939 and 954,800 on the average of the five years ending 1938; percentages 101.1 and 110.1. The corresponding production is estimated at about 23,739,000 centals (52,754,000 bushels) against 24,175,000 (53,722,000) and 21,078,000 (46,839,000); percentages 98.2 and 112.6.

CURRENT INFORMATION ON POTATOES.

Spain: It is confirmed that the potato crop is quite good, and it is estimated quite sufficient for home consumption.

Portugal: The potato production was high, especially in the important provinces of Guarda and Viseu.

Production of potatoes.

| COUNTRIES | British units | | | American Units | | | % 1940 | |
|-------------------------|-------------------------|-------------------------|---------------------------|-------------------------------|-------------------------|---------------------------|--------|---------|
| | 1940 | 1939 | Average 1934 to 1938 | 1940 | 1939 | Average 1934 to 1938 | 1939 | Average |
| | Thousand centals | | | Thousand bushels of 60 pounds | | | = 100 | = 100 |
| Germany (a) | 1,298,527 | 1,240,766 | (¹)1,136,266 | 2,164,169 | 2,067,902 | (¹)1,893,739 | 104.7 | 114.3 |
| Finland (b) | 112,000 | — | — | 246,919 | — | — | — | — |
| Hungary | 33,510 | 29,308 | (¹) 28,337 | 55,850 | 48,846 | (²) 47,227 | 114.3 | — |
| Italy (6) | (¹) 75,870 | (¹) 50,553 | (¹) 47,014 | (¹) 126,448 | (¹) 84,253 | (¹) 78,356 | — | — |
| Luxemburg | 5,467 | 5,683 | 4,482 | 9,112 | 9,472 | 7,470 | 121.2 | 118.8 |
| Norway | 24,890 | 17,790 | 19,670 | 41,482 | 29,650 | 32,782 | 96.2 | 122.0 |
| Romania (7) | 30,844 | 29,344 | — | 51,405 | 48,905 | — | 139.9 | 126.5 |
| Sweden | 49,377 | 41,189 | 41,011 | 82,294 | 68,648 | 68,350 | 105.1 | — |
| Yugoslavia | 42,108 | 30,252 | 35,630 | 70,179 | 50,419 | 59,382 | 119.9 | 120.4 |
| U.S.S.R. | — | — | — | — | — | — | 139.2 | 118.2 |
| Lithuania | 58,601 | 51,887 | (¹) 48,309 | 97,666 | 86,477 | (¹) 80,513 | — | — |
| United States | 238,633 | 217,895 | 227,263 | 397,722 | 363,159 | 378,772 | 112.9 | — |
| | | | | | | | 109.5 | 105.0 |

a) Not including: Danzig, Western Prussia, Wartheland, Protectorat of Bohemia-Moravia and Generalgouvernement. — b) Danzig, Western Prussia and Wartheland.

(¹) 1932-1938. — (²) Previous territory. — (³) Including the northern region reattached and Subcarpathia. — (⁴) Including the northern region reattached, but not including Subcarpathia. — (⁵) Territory at the end of 1937. — (⁶) Main crop. — (⁷) Not including Bessarabia and northern Bucovina.

Yugoslavia: Weather conditions in the month of November were favourable to the ripening and picking up of potatoes. The area sown to potatoes this year shows a slight increase as compared with last year and the average for the years 1934-38. Thanks to a very high yield by acre, it is foreseen that the potato crop this year will be very abundant. According to recent official information it will be even higher than the top crop of 1934. This high production is expected to be fully sufficient to fill the needs of the country, and may even leave some surplus for exports.

Argentine: The planting of potatoes was done under favourable conditions. The development of early varieties is proceeding normally.

SUGAR SEASON.

Since the publication of the November issue of our Bulletin, only very small changes were registered in the estimates of the sugar beets production in Europe. An increase was reported from Denmark and Italy. As regards Italy, we had given in our Table in the November issue of our Bulletin the figure of the sugar production fixed by the Ministerial decree of September 30 ult. But the sugar

Production of Beet-Sugar (raw).

| COUNTRIES | TOTAL PRODUCTION DURING THE SEASON | | | % 1940-41 | |
|---|---------------------------------------|-----------|----------------------------------|------------------|------------------|
| | 1940-41 (1) | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 = 100 | Average = 100 |
| | thousand centals | | | | |
| Germany | ... | 2) 56,919 | 45,865 | ... | ... |
| Bohemia-Moravia | ... | 2) 10,340 | 14,323 | ... | ... |
| Slovakia | 2) 1,367 | 1,184 | ... | ... | ... |
| General Gouvernement (Poland) | ... | 2) 1,923 | 10,828 | ... | ... |
| Belgium | 5,953 | 5,755 | 5,175 | 102 | 115 |
| Bulgaria | 882 | 661 | 353 | 133 | 250 |
| Denmark | 5,556 | 5,556 | 4,221 | 100 | 132 |
| Spain | 3,924 | 1,947 | 4,478 | 202 | 88 |
| Finland | 176 | 188 | 251 | 94 | 70 |
| France | ... | 22,779 | 21,349 | ... | ... |
| Hungary | 3,968 | 2,875 | 2,728 | 138 | 145 |
| Ireland | 2,205 | 1,436 | 1,816 | 154 | 121 |
| Italy | 12,015 | 10,472 | 7,826 | 115 | 154 |
| Netherlands | 6,063 | 5,083 | 4,990 | 119 | 121 |
| Romania | 2,394 | 3,736 | 2,561 | ... | ... |
| United Kingdom | 3) 11,464 | 12,103 | 11,300 | 95 | 101 |
| Sweden | 6,623 | 6,856 | 6,632 | 97 | 100 |
| Switzerland | 331 | 317 | 230 | 104 | 144 |
| Yugoslavia | 2,425 | 2,646 | 1,662 | 92 | 146 |
| <i>Total Europe (a)</i> | ... | 152,776 | 146,588 | ... | ... |
| U. S. S. R. | 4) 58,202 | 54,675 | 44,684 | ... | ... |
| Latvia | ... | 882 | 1,070 | ... | ... |
| Lithuania | ... | 530 | 503 | ... | ... |
| <i>Total Europe (b)</i> | ... | 208,863 | 192,845 | ... | ... |
| Canada | ... | 1,916 | 1,485 | ... | ... |
| United States | ... | 35,160 | 28,342 | 105 | 130 |
| <i>Total North America</i> | 37,000 | 37,076 | 29,827 | ... | ... |
| Japan | ... | 689 | 982 | ... | ... |
| Turkey | 2,315 | 2,315 | 1,335 | 100 | 173 |
| <i>Total Asia</i> | ... | 3,004 | 2,317 | ... | ... |
| <i>GENERAL TOTALS</i> | (a) ... | 192,856 | 178,732 | ... | ... |
| | (b) ... | 248,943 | 224,989 | ... | ... |

(a) Not including U. S. S. R. — (b) Including U. S. S. R. — (1) Approximate data. — (2) Data of International Association for Sugar Statistics. — (3) Licht's estimate. — (4) Including the part of Poland incorporated in U. S. S. R., Latvia and Lithuania.

beets production was so abundant that the sugar production was about 10 per cent above the amount fixed by the Government. Among other data, for the first time we find the figure on the sugar beets production in the United States, which are the most important beet sugar producers, among the extra-European

sugar beets producing countries. Although the area sown to sugar beets this year was nearly the same as last year, the course of the weather was so particularly favourable to the sugar beets production that the crop was very abundant; more abundant than in 1939, and still more than the average of the five year period 1934-1938.

CURRENT INFORMATION ON SUGAR.

Production of Cane-Sugar.

| COUNTRIES | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | 1939-40 (1) | 1938-39 | Average of 1933-34 to 1937-38 | % 1939-40 | |
|-----------------------------|-------------|---------|--|-------------|------------|--|-----------|---------|
| | | | | | | | 1938-39 | Average |
| | ooo centals | | | short tons | | | = 100 | = 100 |
| AMERICA. | | | | | | | | |
| Antigua. | 304 | 493 | 514 | 15,200 | 24,640 | 25,688 | 62 | 59 |
| Argentina. | 11,442 | 10,244 | 8,147 | 572,000 | 512,190 | 407,341 | 112 | 140 |
| Barbados. | 1,587 | 3,502 | 2,517 | 79,000 | 175,114 | 125,850 | 45 | 63 |
| Brazil. | 25,923 | 24,259 | 23,161 | 1,296,130 | 1,212,953 | 1,158,050 | 107 | 112 |
| Cuba. | 62,567 | 61,730 | 57,752 | 3,128,000 | 3,100,000 | 2,887,585 | 101 | 108 |
| Ecuador. | 507 | 483 | 413 | 25,000 | 24,100 | 20,657 | 105 | 123 |
| United States (La. & Fl.) | 10,582 | 11,660 | 7,196 | 530,000 | 583,000 | 359,800 | 91 | 147 |
| British Guiana. | 3,505 | 4,239 | 3,978 | 175,000 | 211,954 | 198,899 | 83 | 88 |
| Surinam. | 245 | 270 | 378 | 12,240 | 13,499 | 18,895 | 91 | 65 |
| Jamaica. | 2,227 | 2,642 | 2,086 | 111,000 | 132,100 | 104,287 | 84 | 107 |
| Martinique. | 1,323 | 1,433 | 1,104 | 70,000 | 72,000 | 55,206 | 92 | 120 |
| Mexico. | 6,834 | 7,772 | 6,037 | 340,000 | 388,602 | 301,854 | 88 | 113 |
| Peru. | 8,686 | 8,157 | 8,702 | 434,000 | 410,000 | 435,102 | 106 | 100 |
| Puerto Rico. | 20,393 | 17,042 | 18,515 | 1,020,000 | 852,000 | 925,750 | 120 | 110 |
| Dominican Republic. | 10,031 | 9,524 | 9,030 | 502,000 | 476,000 | 451,494 | 105 | 111 |
| St. Kitts. | 626 | 836 | 659 | 31,300 | 41,816 | 32,944 | 75 | 95 |
| St. Lucia. | 220 | 180 | 168 | 11,000 | 9,016 | 8,424 | 122 | 130 |
| Trinidad. | 2,866 | 2,877 | 2,983 | 140,000 | 143,870 | 149,129 | 100 | 96 |
| Venezuela. | 551 | 540 | 489 | 28,000 | 27,000 | 24,472 | 102 | 113 |
| Total America. | 170,419 | 167,883 | 153,829 | 8,519,870 | 8,409,854 | 7,691,410 | 102 | 111 |
| ASIA. | | | | | | | | |
| Taiwan. | 26,630 | 33,671 | 19,895 | 1,331,500 | 1,683,500 | 994,719 | 79 | 134 |
| India. | 72,532 | 56,879 | 59,190 | 3,630,000 | 2,840,000 | 2,959,455 | 128 | 123 |
| Japan. | 3,386 | 3,596 | 2,359 | 169,300 | 179,800 | 117,951 | 94 | 144 |
| Java. | 34,841 | 33,613 | 19,839 | 1,692,000 | 1,730,000 | 991,927 | 98 | 171 |
| Philippines. | 24,912 | 22,708 | 23,455 | 1,250,000 | 1,140,000 | 1,172,739 | 110 | 106 |
| Total Asia. | 161,301 | 151,467 | 124,738 | 8,072,800 | 7,573,300 | 6,236,791 | 106 | 129 |
| AFRICA. | | | | | | | | |
| Egypt. | 3,524 | 3,573 | 3,179 | 176,200 | 178,634 | 158,951 | 99 | 111 |
| Mauritius. | 5,059 | 7,084 | 5,886 | 252,930 | 354,180 | 294,310 | 71 | 86 |
| Reunion. | 1,622 | 1,890 | 1,745 | 81,100 | 94,505 | 87,267 | 86 | 93 |
| Union of South Africa | 11,623 | 11,616 | 9,426 | 581,100 | 580,800 | 471,230 | 100 | 123 |
| Total Africa. | 21,828 | 24,163 | 20,236 | 1,091,330 | 1,208,119 | 1,011,808 | 90 | 108 |
| OCEANIA. | | | | | | | | |
| Australia. | 20,900 | 18,437 | 15,933 | 1,045,000 | 921,900 | 796,647 | 113 | 131 |
| Hawaii. | 19,268 | 19,401 | 18,961 | 963,000 | 970,000 | 948,051 | 99 | 102 |
| Fiji Islands. | 2,205 | 2,654 | 2,912 | 100,000 | 132,700 | 145,602 | 83 | 76 |
| Total Oceania. | 42,373 | 40,492 | 37,806 | 2,108,000 | 2,024,600 | 1,890,300 | 105 | 112 |
| TOTALS. | 395,921 | 384,005 | 336,609 | 19,792,000 | 19,215,873 | 16,830,309 | 103 | 118 |

(1) Approximate data.

Spain: Crop forecasts are favourable in nearly all the producing zones. Only in the province of Saragozza the crop was considerably damaged, and yields appear rather low.

Italy: According to the most recent estimate the area cultivated to sugar beet this year has been 432,400 acres against 362,600 in 1939 and 283,400 on the average for the five years ending 1938; percentages 119.3 and 152.6. The 1940 production is estimated at about 112,436,000 centals (5,621,700 short tons) against 63,464,600 (3,173,200); on the average: percentage 177.2.

The Ministry of Agriculture has called the attention of the farmers on the necessity of not sowing to sugar beets over 390,000 acres during the 1941-42 season.

Slovakia: The area sown to sugar beets this year was 70,000 acres. Yields were nearly 8,800,000 centals (440,000 sh. tons).

Yugoslavia: The governmental purchase prices of sugar beets destined to sugar factories were recently raised by a decision of the Ministry of Agriculture. The augmentation was 10 dinars per quintal. An advance of the price of sugar for the 1940-41 season is expected. This advance was the consequence of the Government's intention to encourage an increase of areas sown to sugar beets during the next year.

Argentina: The area sown to sugar beets this year is smaller than that of last year.

The sugar cane production was generally abundant this year, except in the northern section of Santa Fé where the crop was damaged by unfavourable weather.

United States: According to the most recent estimate, the area cultivated to sugar beet this year is about 921,000 acres against 917,000 in 1939 and 799,000 on the average for the five years ending 1938; percentages 100.4 and 115.3. The corresponding production is estimated at about 239,380,000 centals (11,969,000 short tons) against 215,620,000 (10,781,000) and 179,416,000 (8,971,000); percentages 111.0 and 133.4.

The area cultivated to sugarcane only for sugar production, this year will be about 269,200 acres against 258,100 in 1939 and 260,100 on the average for the five years ending 1939; percentages 104.3 and 103.5. The corresponding production is estimated at about 93,420,000 centals (4,671,000 short tons) against 115,960,000 (5,798,000) and 100,112,000 (5,005,600); percentages 80.6 and 93.3.

CURRENT INFORMATION ON VINES.

Portugal: The production of raisins appears very poor. Their quality however is quite good.

Yugoslavia: The analysis of must produced in Dalmatia and Herzegovina this year gave the following results: (1) quality, except for some rare cases, average; (2) sugar contents, in the majority of the regions of production, slightly below average; (3) acidity, remarkably above normal in nearly all wine regions.

Argentina: In October the conditions of vines in the principal wine producing sections of the country, were good.

CURRENT INFORMATION ON OLIVES.

Spain: According to the most recent information, the olive crop is nearly average. In Andalusia, the crop is low in the western regions, and average in the eastern regions. Forecasts are good in the province of Ciudad Real. An average crop is registered in Arragon, Levant and Estremadura.

Portugal: The olive crop is very low and it is estimated below one half the average production.

Yugoslavia: Mild and not too rainy weather in the month of November was favourable to ripening and picking of olives. Olives however had suffered rather seriously from attacks of "dacus" and fell prematurely to the ground. The most serious damage was registered in the regions of the central litoral where the production is expected to be from 30 to 50 per cent. lower than last year. In Dalmatia, both north and south, the olive crop appears better, especially from the point of view of its quality. During the month of November the olive harvest was continued in every olive-producing section. Towards the end of the same month olive harvest operations were over in northern Dalmatia. The tendency of olive and oil prices is towards an advance. It is expected that exports of olives and olive oil will be forbidden, especially from regions where the production appears weak.

Argentina: In October, the conditions of olive trees in the provinces of Catamarca, La Rioja, and San Juan were good.

THE WORLD STATISTICAL SITUATION OF LINSEED, LINSEED OIL AND LINSEED OIL SUBSTITUTES.

World production of linseed.

In our October Crop Report we examined the results of the present linseed season in some countries that had communicated their production estimates. We also gave our forecasts for other countries (more numerous this year than ordinarily) for which information was lacking. As we had foreseen, the gaps are almost entirely referable to the European countries; in fact, only Hungary and Lithuania have communicated an estimate on their production. As regards the latter country, the Institute forecast for an average production, has been confirmed. The area sown to linseed in Lithuania this year was 10 per cent larger than in 1939.

World Production of Linseed.

(1,000 bushels of 56 lb.).

| CONTINENTS | 1940-41 | 1939-40 | Average 1934-35/ 1938-39 | 1938-39 | 1937-38 | 1936-37 | 1935-36 | 1934-35 | Average 1929-30/ 1933-34 |
|---------------------------------|----------|----------|--------------------------------|----------|----------|----------|----------|----------|--------------------------------|
| North and Central America . . . | 34,644 | 22,440 | 9,559 | 9,567 | 8,031 | 7,204 | 16,299 | 6,693 | 16,259 |
| South America | 82,674 | 44,644 | 70,170 | 59,958 | 64,367 | 80,902 | 62,478 | 83,146 | 71,926 |
| Argentina | (78,737) | (39,935) | (66,630) | (55,510) | (60,604) | (77,867) | (59,446) | (79,721) | (68,403) |
| Asia (1) | 19,369 | 18,306 | 17,007 | 19,133 | 17,322 | 16,023 | 17,204 | 15,354 | 15,547 |
| Europe (2) | 9,448 | 9,330 | 8,763 | 9,055 | 9,763 | 10,039 | 8,622 | 6,338 | 6,543 |
| U. S. S. R. | ... | ... | 29,025 | 29,526 | 29,920 | 29,526 | 29,133 | 27,019 | 30,022 |
| Africa | 472 | 433 | 449 | 382 | 535 | 496 | 366 | 468 | 579 |
| Oceania | 39 | 31 | 27 | 35 | 20 | 12 | 31 | 39 | 102 |
| GENERAL TOTALS: | | | | | | | | | |
| EXCLUDING U. S. S. R. | 146,646 | 95,184 | 105,975 | 98,130 | 100,038 | 114,676 | 105,000 | 112,038 | 110,956 |
| INCLUDING U. S. S. R. | ... | ... | 135,000 | 127,656 | 129,958 | 144,202 | 134,133 | 139,057 | 140,978 |

(1) Excluding U. S. S. R. and China. — (2) Excluding U. S. S. R. — (3) Unofficial data.

In the Protectorate of Bohemia and Moravia, the area was considerably increased: from 10,000 acres in 1939 to 32,000 acres in 1940.

But the importance of Europe as regards the world linseed production is comparatively little. In fact, its production is normally below 10 per cent of the world total, not including the U. S. S. R. After the publication of the first estimate of production in Argentina, and in spite of numerous gaps in the data for the European countries (for which however there is available considerable information on the trend of the season and on the growth of the crop), it is possible

Area and Production of Flax.

| COUNTRIES | † AREA | | | | † PRODUCTION | | | | | | | | |
|-----------|------------------------|------------------------|---|--------------------------|---------------------|---------------------|---|------------------------|------------------------|---|--------------------------|---------------------------------------|----------------|
| | 1940 and 1940-41 | 1939 and 1939-40 | Aver. 1934 to 1938 and 1934-35 to 1938-39 | % 1940 and 1940-41 | 1940 and 1941 | 1939 and 1940 | Aver. 1934 to 1938 and 1934-35 to 1938-39 | 1940 and 1939-40 | 1939 and 1939-40 | Aver. 1934 to 1938 and 1934-35 to 1938-39 | % 1940 and 1940-41 | 1939 and 1939- 1940 = 100 | Aver. = 100 |
| | | | 1939 and 1940 | Aver- age | | | 1939 and 1940 | | | Aver- age | | | |
| | | | = 100 | = 100 | | | = 100 | | | = 100 | | | |
| | | | ooo acres | ooo centals | | | ooo lb. | | | = 100 | | | |

Fibre.

| | | | | | | | | | | | | | |
|---------------------------|-------------------|-------------------|-------|-------|-------|-------------------|-------------------|-------------------|----------------------|----------------------|----------------------|-------|-------|
| Belgium . . . | 136 | 110 | 68 | 123.0 | 199.1 | ... | 1,031 | 478 | ... | 130,053 | 47,752 | ... | ... |
| Hungary . . . | 12 ^{a)} | 10 ^{a)} | 8 | — | — | 72 ^{a)} | 48 ^{a)} | 32 ^{a)} | 7,180 ^{a)} | 4,822 ^{a)} | 3,163 ^{a)} | — | — |
| Romania . . . | 34 ^{a)} | 30 ^{a)} | 6 | — | — | 122 ^{a)} | 126 ^{a)} | 194 ^{a)} | 12,163 ^{a)} | 12,596 ^{a)} | 19,360 ^{a)} | — | — |
| U. S. S. R. ^{a)} | 4,448 | 4,423 | 5,126 | 100.6 | 86.8 | ... | 13,889 | 12,258 | ... | 1,388,917 | 1,225,757 | ... | ... |
| Estonia . . . | ... | 57 | 66 | ... | ... | 175 | 135 | 195 | 17,527 | 13,482 | 19,489 | 130.0 | 89.9 |
| Lithuania ^{a)} | 233 ^{a)} | 211 ^{a)} | 193 | 110.4 | ... | 637 ^{a)} | 645 ^{a)} | 619 ^{a)} | 63,709 ^{a)} | 64,507 ^{a)} | 61,879 ^{a)} | 98.8 | ... |
| Egypt . . . | 10 | 10 | 6 | 102.6 | 162.4 | 84 | 81 | 43 | 8,419 | 8,146 | 4,348 | 103.4 | 193.6 |

Linseed.

| | ooo bushels of 56 lb. | | | | | | | | | | | | | |
|---------------------------------|--------------------------|----------------------|----------------------|-------|-------|-------------------|-------------------|--------|---------------------|---------------------|--------|-------|-------|--|
| Belgium . . . | 136 | 110 | 68 | 123.0 | 199.1 | ... | 553 | 304 | ... | 987 | 542 | ... | ... | |
| Hungary . . . | ¹⁾ 20 | ¹⁾ 20 | 21 | — | — | ¹⁾ 149 | ¹⁾ 151 | 121 | ... | 266 | 269 | 216 | — | |
| Romania . . . | ⁴⁾ 34 | 30 | 60 | — | — | ... | 115 | 208 | ... | 205 | 371 | ... | ... | |
| *U. S. S. R. ⁽¹⁾⁽¹⁰⁾ | ... | ... | 5,809 | ... | ... | ... | ... | 16,254 | ... | ... | 29,025 | ... | ... | |
| Estonia | ... | 57 | 66 | ... | ... | ... | 152 | 207 | ... | 271 | 369 | ... | ... | |
| Lithuania ^(*) | ^{*)} 233 | ^(*) 211 | ^(*) 193 | 110.4 | ... | ^{*)} 725 | ^{*)} 725 | 730 | ^{*)} 1,294 | ^{*)} 1,295 | 1,303 | 99.9 | — | |
| Canada | 397 | 307 | 292 | 129.3 | 135.7 | 1,907 | 1,215 | 717 | 3,406 | 2,169 | 1,281 | 157.0 | 265.8 | |
| United States. | 3,328 | 2,250 | 1,217 | 147.9 | 273.4 | 17,431 | 11,285 | 4,558 | 31,127 | 20,152 | 8,139 | 154.5 | 382.4 | |
| India ⁽¹¹⁾ | 3,713 | 3,869 | 3,542 | 96.0 | 104.8 | 10,461 | 9,901 | 9,296 | 18,680 | 17,680 | 16,600 | 105.7 | 112.5 | |
| Egypt. . . . | 10 | 10 | 6 | 102.6 | 162.4 | 65 | 58 | 45 | 115 | 104 | 81 | 110.8 | 143.0 | |
| Argentina . . . | ¹²⁾ 6,760 | ¹²⁾ 7,600 | ¹²⁾ 7,401 | 88.9 | 91.3 | 44,093 | 22,364 | 37,312 | 78,737 | 39,935 | 66,630 | 197.2 | 118.2 | |
| Uruguay . . . | 460 | 584 | 370 | 78.7 | 124.1 | ... | 2,628 | 1,968 | ... | 4,693 | 3,515 | ... | ... | |

† The years indicated are those of the harvest, single years referring to the Northern Hemisphere, double years to the Southern.

1) Including the reannexed north zone and Sub-Carpathia. — 2) Including the reannexed north zone but excluding Sub-Carpathia. — 3) Territory as at end of 1937. — 4) Not including Bessarabia and Northern Bucovina. — 5) "Dolgunez" variety grown for linseed and flax. — 6) Former territory. — 7) Approximate figure, not official. — 8) Flax and hemp. — 9) Actual territory. — 10) Total: varieties: Dolgunez and "Kudriash" — 11) Final report. — 12) Area sown.

to make a sufficiently correct numerical estimate of the world linseed production. It must be remembered that in Europe (considering this continent within its old frontiers, before the incorporation of various territories in the U. S. S. R.), the total area on which linseed was harvested this year has remained, in all probability, equal to the very large one of 1939, but 15 per cent larger than the average of the five preceding years.

The total 1940 production on this continent may be estimated at 5,291,000 centals (9,448,000 bushels). Practically this production is the same as last year's, but 7.8 per cent above the average of the five preceding years.

On the whole this production was abundant; but, owing to generally unfavourable weather, and other causes, it was not in proportion with the increase of the area which was 15 per cent above the average.

In the Soviet Union, the plan of sowings for 1940 in the collective holdings, which include the totality of the production of linseed of the "Dolgunetz" variety in the Union, though somewhat delayed, was fully put into effect. The area set by the plan (4,448,000 acres) is slightly (0.6 per cent) larger than in 1939, but it is 13.2 per cent below the average of the five years 1934-38. As regards the "Kudriash" variety, which is especially cultivated for the production of seeds, figures relative to the area sown to linseed in 1939 and 1940 are still lacking. The area assigned to this variety was considerably increased: from 608,000 acres in 1934 to 870,000 in 1938. It seems that this tendency continued in 1940. But whatever may be the area sown to the "Kudriash" variety, the bulk of the linseed production in the Soviet Union is represented by the "Dolgunetz" variety, which is grown both for fibre and seeds. No official estimate on this year production is available. The most recent information however confirms that the yields, though lower than the generally high ones of last year, were satisfactory in all the linseed producing regions. At this point it must be remarked that the part played by the U. S. S. R. as a large linseed producer, became considerably more important after the incorporation of a part of Poland, and of the three Baltic countries (Lithuania, Latvia and Estonia). Seventy five per cent of the total linseed production of Poland has been absorbed by the U. S. S. R. As a matter of fact, nearly 2,640,000 centals (4,720,000 bushels) i. e., about 50 per cent of the whole European production has been absorbed by the Soviet Union. The Soviet linseed production, including the recently incorporated countries, amounts to something over 18,750,000 centals (33,460,000 bushels). The surplus available for export is limited, however, because the growing needs of the home market have absorbed and will probably continue to absorb almost entirely the increased national production.

In North America, owing to the increase of area and to favourable weather conditions, the linseed production this year has been exceptionally good. In the United States the area was increased by 47.9 per cent and 173.4 per cent respectively as compared with last year and the average of the five preceding years, thanks especially to protective measures taken under the regime of the *Agricultural Conservation Program*. Weather conditions were very favourable to the growth of the crop. According to the most recent official estimate dated December 18, the 1940 production in the United States = 17,431,000 centals =

(31,127,000 bushels), shows very considerable proportional increases, reaching respectively 54.5 per cent and 282.4 per cent.

In Canada the area sown to linseed was also increased. The crop this year was favoured here, as well as in the United States, by suitable weather, and the production is notably above that of last year (57 per cent) and that of the average of the five preceding years (165.8 per cent). The total production of these two North American countries appears exceptionally high (19,338,000 centals) (34,533,000 bushels); it is in fact 54.7 per cent above the good one of last year (12,500,000 centals, 22,321,000 bushels) and of the average of the five preceding years (5,275,000 centals 9,420,000 bushels). Both in the United States and Canada, the exceptionally high yield of the crop is enhanced by a very high degree of oil contents.

In Argentina, which plays an absolutely preponderant part in the world production of linseed, weather conditions during the current season were rather irregular: excessively rainy, and therefore unfavourable, during plowing and

Area, Production and Yield of Linseed in Argentina.

| YEARS | AREA | | | PRODUCTION | | | |
|-------------------------------|--------------|--------------|--------------------------------|---------------|---------------|--------------------|-------------|
| | sown | harvested | % of sown area harvested | total | | per acre harvested | |
| | 1,000 acres | 1,000 acres | % | 1,000 centals | 1,000 bush. | centals | bushels |
| 1940-41 | 6,760 | ... | ... | 44,093 | 78,737 | ... | ... |
| 1939-40 | 7,600 | (1) 4,942 | 65.0 | 22,364 | 39,935 | 4.6 | 8.1 |
| <i>Aver. 1934-35/1938-39.</i> | <i>7,401</i> | <i>6,363</i> | <i>86.0</i> | <i>37,312</i> | <i>66,630</i> | <i>5.9</i> | <i>10.5</i> |
| 1938-39 | 6,608 | 5,787 | 87.6 | 31,085 | 55,510 | 5.4 | 9.6 |
| 1937-38 | 7,077 | 5,691 | 80.4 | 33,938 | 60,604 | 6.0 | 10.6 |
| 1936-37 | 8,646 | 7,626 | 88.2 | 43,605 | 77,867 | 5.7 | 10.2 |
| 1935-36 | 6,573 | 5,607 | 85.3 | 33,290 | 59,446 | 6.0 | 10.7 |
| 1934-35 | 8,103 | 7,104 | 87.7 | 44,644 | 79,721 | 6.3 | 11.2 |
| <i>Aver. 1929-30/1933-34.</i> | <i>7,500</i> | <i>6,303</i> | <i>84.1</i> | <i>38,306</i> | <i>68,403</i> | <i>6.1</i> | <i>11.0</i> |
| 1933-34 | 6,855 | 4,878 | 71.2 | 35,054 | 62,596 | 7.2 | 12.8 |
| 1932-33 | 7,401 | 6,395 | 86.4 | 34,723 | 62,005 | 5.4 | 9.7 |
| 1931-32 | 8,641 | 8,263 | 95.6 | 49,878 | 89,067 | 6.0 | 10.8 |
| 1930-31 | 7,512 | 6,749 | 89.8 | 43,872 | 78,343 | 6.5 | 11.6 |
| 1929-30 | 7,092 | 5,231 | 73.8 | 28,003 | 50,006 | 5.4 | 9.6 |

(1) Unofficial data.

sowing, the weather improved considerably later and favoured the growth and the flowering of the plants. Official reports, published at the beginning of November and December, indicated that in the regions of the country where linseed is chiefly grown, the condition of the crop varied from good to excellent. The first estimate published on December 13 by the Argentine Government

shows that the linseed production this year is exceptionally abundant as it reaches the figure of 44,093,000 centals (78,737,000 bushels) i. e., nearly double of the extremely low one of 1939-40 (22,364,000 centals) (39,935,000) and that it is 18.2 per cent above the figure of the five preceding years (37,312,000 centals (66,630,000). This high production was obtained on an area sown of 6,760,000 acres, which is 11.1 per cent less than last year and 8.7 per cent below the average of the five preceding years.

The decrease in the area sown this year to linseed in Argentina was due partly to the unfavourable weather conditions at the time of plowing, but principally to the intention of the farmers to limit production on account of marketing difficulties under the present circumstances. However in spite of precautionary measures taken by the Argentine farmers, the crop this year, favoured by suitable weather, is particularly abundant. The data for the amount of the harvested area is not known yet; but it is clear that the difference between it and the figure of the area sown this year, will be very low; the more so as the damages caused the crop by unfavourable factors have been negligible nearly everywhere.

In Uruguay, the area sown to linseed, after a constant increase which attained its maximum in 1939/40, has suddenly decreased this year, owing mostly to difficulties met in the export of the old crop. The area cultivated to linseed in this country, though it is about 1/4 above the average of the five years which ended in 1938/39, is 21.3 per cent. lower than the top figure of the last season. On the whole, the weather was unfavourable to the crop. The amount of the production of the present season is not known yet; but it is forecast, that it will not be far from 2,200,000 centals (3,900,000 bushels), which constitutes a good average output.

Production in India, on an area 4 per cent. less than in 1939, but about 5 per cent. above the average, is 5.7 per cent. higher than the production last year and 12.5 per cent. above the average of the five preceding years. The good crop of this year was due to generally favourable weather conditions and to well distributed rainfalls during the different vegetative stages of the plants, especially in the Central Provinces.

In Africa, the production was satisfactory in French Morocco and abundant in Egypt. The total production on this continent, estimated at about 265,000 centals (472,000), is a good average one, nearly 10 per cent. higher than that of last year. All in all, the world linseed production in 1940/41 can be estimated at over 82,000,000 centals (146,600,000), as against 53,352,000 (95,200,000) in the last season and 59,305,000 (105,975,000) and 62,171,000 (112,038,000), which were the averages registered respectively in the five year periods ended in 1938/39 and 1933/34.

The exceptionally high production this year must be attributed to the fact that all the most important linseed producing countries (Argentina, United States, Canada and India) have registered, during the same year, very good crops; while the modest productions in Europe and Africa were satisfactory.

World Linseed Trade.

Principal exporting countries. — The world linseed trade is entirely dominated by the Argentine production, which furnishes normally 4/5 of the world total. Yearly fluctuations (which are sometimes very marked) in the world linseed trade are normally to be attributed to variations in the yearly exports from Argentina, which on their turn are strictly related to the volume of production in that country. Thus the world linseed exports in 1939, estimated at nearly 35,210,000 centals (62,875,000 bushels), though they were affected by war conditions in Europe, proved the smallest in a long series of years, owing chiefly to the low Argentine crop in 1938/39 which caused a big decrease in the

World Exports of Linseed.

| YEARS | Argentina | | India | | Uruguay | | Other countries | | Total | |
|-------------------|---------------|------|---------------|------|---------------|-----|------------------------------|-----|---------------|-----|
| | 1,000 bushels | % | 1,000 bushels | % | 1,000 bushels | % | 1,000 ⁽¹⁾ bushels | % | 1,000 bushels | % |
| 1939 | 46,581 | 74.1 | 10,629 | 16.9 | 4,287 | 6.8 | 1,378 | 2.2 | 62,875 | 100 |
| 1938 | 49,805 | 75.9 | 11,472 | 17.5 | 2,846 | 4.3 | 1,504 | 2.3 | 65,627 | 100 |
| 1937 | 70,942 | 83.1 | 8,850 | 10.4 | 2,953 | 3.4 | 2,653 | 3.1 | 85,398 | 100 |
| 1936 | 58,576 | 75.1 | 12,381 | 15.9 | 3,027 | 3.9 | 4,000 | 5.1 | 77,984 | 100 |
| 1935 | 69,986 | 86.7 | 5,173 | 6.4 | 2,779 | 3.4 | 2,803 | 3.5 | 80,741 | 100 |
| 1934 | 54,108 | 77.0 | 11,027 | 15.7 | 2,791 | 4.0 | 2,287 | 3.3 | 70,213 | 100 |
| 1933 | 54,813 | 74.7 | 13,897 | 18.9 | 2,382 | 3.3 | 2,299 | 3.1 | 73,391 | 100 |
| 1932 | 79,824 | 90.3 | 3,086 | 3.5 | 3,083 | 3.5 | 2,398 | 2.7 | 88,391 | 100 |
| 1931 | 74,025 | 84.7 | 4,500 | 5.1 | 5,232 | 6.0 | 3,638 | 4.2 | 87,395 | 100 |
| 1930 | 46,045 | 72.3 | 10,456 | 16.4 | 3,114 | 4.9 | 4,102 | 6.4 | 63,717 | 100 |
| 1929 | 63,679 | 79.2 | 10,004 | 12.4 | 2,177 | 2.7 | 4,575 | 5.7 | 80,435 | 100 |
| Average 1924-1928 | 61,655 | 76.1 | 10,004 | 12.3 | 1,866 | 2.3 | 7,515 | 9.3 | 81,040 | 100 |

(1) Calculated data.

exports from Argentina. Linseed exports were in fact by 440,000 centals (842,000 bushels) lower than the abnormally low world exports in 1930, caused in their turn by the disastrous Argentine crop in 1929-30. In 1939 Argentina contributed only 74.1 per cent. of the world supply. This proportion is very near the minimum registered in 1930, while in 1932 the Argentine contribution to the world linseed supply was 90.3 per cent.

As regards the marketing of the 1939-40 production, available data show a gradual, well marked decrease of exports from the beginning of the present commercial season (January 1, 1940), which, by a decree of the Argentine government, coincides with the calendar year. Exports during the first three months of the year (January-March 1940) were the lowest registered in the course of many years, except 1938. They were in fact 2,531,000 centals (4,502,000) and 3,164,000 (5,651,000 bushels) lower than the averages of the corresponding five years, ended respectively in 1939 and 1934. During the second quarter of the year, exports decreased again, and the decrease became greatly accentuated in the course of the

following quarter, when it hardly totalled 922,000 centals (1,646,000) as against 6,945,000 centals (12,400,000) and 7,677,000 centals (13,707,000) exported, as an average, during the five year periods ended respectively in 1939 and 1934. The total of the first nine months of the present trade season (January 1, September 30, 1940) hardly reaches the figure of 14,440,000 centals (25,787,000) as against 25,331,000 centals (45,232,000) and 26,963,000 centals (48,147,000) as an average exported during the same periods of five years ended respectively in 1939 and 1934. This big decrease in the Argentine exports during the present season is due partly

Linseed Production in and Exports from Argentina.

| YEARS | PRO- DUCTION | EXPORTS | | | | | |
|-----------------------|-----------------|------------------|-------------------|------------------|-------------------|----------|----------------------|
| | | first quarter | second quarter | third quarter | fourth quarter | Total | |
| | | | | | | absolute | % of pro- duction |
| (1,000 bushels) | | | | | | | |
| 1940 | 39,935 | 16,472 | 7,669 | 1,646 | ... | ... | ... |
| Average 1935/1939 . . | 66,629 | 20,974 | 11,858 | 12,400 | 13,946 | 59,178 | 88.8 |
| 1939 | 55,510 | 19,802 | 5,972 | 10,547 | 6,260 | 46,581 | 83.9 |
| 1938 | 60,604 | 15,417 | 9,437 | 9,484 | 15,467 | 49,805 | 82.2 |
| 1937 | 77,867 | 26,928 | 15,307 | 12,527 | 16,180 | 70,942 | 93.1 |
| 1936 | 59,446 | 17,897 | 9,311 | 14,460 | 16,908 | 58,576 | 98.5 |
| 1935 | 79,721 | 24,826 | 15,263 | 14,984 | 14,913 | 69,986 | 87.8 |
| Average 1930/1934 . . | 68,403 | 22,123 | 12,317 | 13,707 | 13,617 | 61,764 | 90.3 |
| 1934 | 62,596 | 21,775 | 8,976 | 10,925 | 12,432 | 54,108 | 86.5 |
| 1933 | 62,005 | 20,806 | 12,830 | 10,658 | 10,519 | 54,813 | 88.4 |
| 1932 | 89,067 | 24,046 | 16,106 | 20,779 | 18,893 | 79,824 | 89.6 |
| 1931 | 78,343 | 25,200 | 15,350 | 18,314 | 15,161 | 74,025 | 94.5 |
| 1930 | 50,006 | 18,787 | 8,322 | 7,858 | 11,078 | 46,045 | 92.1 |

to the weak crop of 1939-40, and partly to the difficulty of sea traffic which has become ever more serious in the course of the year with the extension of the conflict to the countries of northwestern Europe, among which are the principal importers on this continent. On the basis of a preliminary estimate on production, and after deducting the amounts needed for home industries and seed for a total of about 4,410,000 centals (7,870,000), the surplus from the new Argentine crop available for exports during the coming commercial season (January 1, December 31, 1941)—may reach 39,680,000 centals (70,860,000). To this amount must be added the surplus stocks from the preceding season, which amount to at least 2,205,000 centals (3,940,000). The total exportable Argentine surplus in the calendar year 1941 could be estimated at 41,885,000 centals (74,800,000). This amount may be subject to a modification after a revision of the preliminary estimate on the production. Exports from India in 1939 amounted to 5,953,000 centals (10,629,000). This figure represents 60.1 per cent. of the production of India and 16.9 per cent. of the world linseed exports. The figures of exports in

the year 1940 are not available. However, if we take into account that this year the demand is not as high as in past years, the Indian exportable surpluses from the production of the present season are undoubtedly higher than those of last year and the most important in a long series of years.

Area and Production in and Exports from India.

| YEARS | AREA | PRO- DUCTION | EXPORTS | | | | | |
|-----------------------|-------------|-----------------|------------------|-------------------|------------------|-------------------|----------|--------------------|
| | | | first quarter | second quarter | third quarter | fourth quarter | Total | |
| | | | | | | | absolute | % of production |
| | 1,000 acres | | (1,000 bushels) | | | | | |
| 1940 | 3,713 | 18,680 | .. | ... | ... | ... | ... | ... |
| Average 1935-1939 . . | 3,661 | 17,047 | 1,520 | 2,870 | 3,074 | 2,237 | 9,701 | 56.9 |
| 1939 | 3,869 | 17,680 | 2,716 | 2,728 | 4,102 | 1,083 | 10,629 | 60.1 |
| 1938 | 3,889 | 18,440 | 1,472 | 3,472 | 3,976 | 2,552 | 11,472 | 62.2 |
| 1937 | 3,677 | 16,799 | 1,264 | 2,442 | 3,189 | 1,955 | 8,850 | 51.7 |
| 1936 | 3,457 | 15,519 | 1,764 | 3,913 | 3,598 | 3,106 | 12,381 | 79.8 |
| 1935 | 3,410 | 16,799 | 382 | 1,795 | 504 | 2,492 | 5,173 | 30.8 |
| Average 1930-1934 . . | 3,087 | 15,640 | 903 | 2,690 | 2,831 | 2,170 | 8,594 | 54.9 |
| 1934 | 3,262 | 15,043 | 1,978 | 3,606 | 3,138 | 2,405 | 11,027 | 73.3 |
| 1933 | 3,301 | 16,240 | 618 | 1,984 | 5,846 | 5,449 | 13,997 | 85.6 |
| 1932 | 3,062 | 16,637 | 819 | 756 | 696 | 815 | 3,086 | 18.6 |
| 1931 | 3,010 | 15,082 | 508 | 1,693 | 1,083 | 1,216 | 4,500 | 29.4 |
| 1930 | 2,802 | 15,200 | 693 | 5,409 | 3,390 | 964 | 10,456 | 68.8 |

Exports from Uruguay in 1939 were very high: they amounted to 2,401,000 centals (4,287,000). This figure is inferior only to the top one of 1931; but the part taken by Uruguay in the world supply in 1939 (6.8 per cent.) represents an absolute maximum. Owing to the war, the marketing of the very abundant production of the 1939-40 season, has met with serious difficulties. During the eight months January-August 1940, exports amounted to only 1,464,000 centals (2,614,000) as against 2,086,000 (3,724,000) during the same period last year.

The three countries mentioned above, i. e., Argentina, followed at a great distance by India and Uruguay, are nearly the only world suppliers of linseed. In 1939 these countries contributed almost 98 per cent. to the world linseed exports, while the Soviet Union with a production which is 1/5 the world production and therefore greater than the production of India and Uruguay together, figures very low in world exports and sometimes it even appears among the importing countries.

Principal importing countries. — The table of the linseed importing trade in 1939 shows numerous gaps. Among the most important European countries for which complete data on net imports in 1939 are available, are Belgium, Denmark, Norway and the Netherlands. As compared with the preceding year, all these countries increased their net 1939 imports to a considerable extent. and except for the Netherlands, their imports exceeded the average.

In 1939, the United States which is the world chief importing country, imported 8,975,000 centals (16,027,000) as against 8,605,000 (15,366,000) in 1938. Generally the United States imports show very marked yearly fluctuations, which are caused by the greater or lesser volume of home production. As shown by the table, imports fluctuated from a minimum 7,940,000 (14,169,000) in 1934 to a maximum 15,650,000 centals (28,030,000) in 1937.

Net Imports of Linseed into the principal European and extra-European countries.

(1,000 bushels).

| COUNTRIES | 1939 | Average 1934/ 1938 | 1938 | 1937 | 1936 | 1935 | 1934 | Average | |
|--|--------|--------------------------|--------|--------|--------|--------|--------|---------------|---------------|
| | | | | | | | | 1929/ 1933 | 1924/ 1928 |
| I. — <i>European countries.</i> | | | | | | | | | |
| Germany | ... | 8,805 | 6,102 | 7,102 | 8,614 | 9,736 | 12,472 | 13,299 | 12,082 |
| Belgo-Lux. Un. | 4,023 | 3,802 | 3,201 | 3,964 | 4,098 | 4,661 | 3,086 | 4,866 | 3,602 |
| Denmark | 1,051 | 801 | 661 | 894 | 803 | 1,004 | 642 | 736 | 752 |
| Spain | ... | 708 | 512 | 591 | 787 | 996 | 654 | 779 | 634 |
| France | ... | 9,833 | 7,996 | 10,783 | 11,118 | 9,964 | 9,303 | 9,181 | 6,960 |
| Italy | ... | 2,555 | 2,071 | 3,193 | 2,134 | 2,838 | 2,539 | 2,496 | 2,370 |
| Norway | 917 | 837 | 827 | 953 | 846 | 957 | 602 | 638 | 606 |
| Netherlands | 11,948 | 12,997 | 11,511 | 12,385 | 12,830 | 15,704 | 12,555 | 13,854 | 12,909 |
| Poland | — | 61 | 0 | 0 | — | — | 303 | 386 | 146 |
| United Kingdom | — | 10,200 | 11,055 | 11,437 | 10,905 | 10,271 | 7,334 | 11,622 | 14,729 |
| Sweden | — | 1,680 | 1,917 | 1,886 | 1,441 | 1,638 | 1,516 | 1,559 | 1,441 |
| Czecho-Slovakia | — | 954 | 689 | 1,075 | 957 | 1,059 | 988 | 1,012 | 823 |
| Total of 1st group . . . | ... | 53,233 | 46,542 | 54,263 | 54,533 | 58,828 | 51,994 | 60,428 | 57,045 |
| II. — <i>Extra-European countries.</i> | | | | | | | | | |
| United States | 16,027 | 18,102 | 15,366 | 28,030 | 15,366 | 17,578 | 14,169 | 14,625 | 19,011 |
| Australia | 1,153 | 1,307 | 1,295 | 1,405 | 1,276 | 1,563 | 996 | 874 | 799 |
| Japan | 94 | 551 | 311 | 315 | 508 | 850 | 772 | 457 | 417 |
| Total of 2nd group . . . | 17,274 | 19,960 | 16,972 | 29,750 | 17,150 | 19,991 | 15,937 | 15,956 | 20,227 |
| GENERAL TOTAL . . . | ... | 73,193 | 63,514 | 84,013 | 71,683 | 78,819 | 67,931 | 76,384 | 77,272 |

Available data for the year 1940, covering a period of nine months (January-September), show that linseed imports into the United States were greatly reduced as compared with the same period last year: 5,185,000 (9,259,000) as against 7,756,000 (13,850,000). This reduction must be attributed to the good crop of 1939 and partly to the excellent one this year.

Among the other extra-European countries, Australia and Japan show a decrease in the 1939 linseed imports as compared with the preceding years. This contraction is particularly noticeable in Japan.

World trade in Linseed Oil, Tung Oil and Perilla Seed and Oil.

Linseed oil. — The slump in the world linseed export trade in 1939 as compared with previous years, has been equally noticed in the world linseed oil exports, which reached the lowest level in a long series of years. The world

linseed oil exports in 1939 estimated at about 167 million lb. not only are very much below exports in 1938 (241 million lb.), but are slightly smaller than the minimum one in 1933. The slump has been especially marked in the Netherlands

World Exports of Linseed Oil.

| YEARS | Netherlands | | France | | Belgium | | Other countries | | World Exports | |
|-------------------|-------------|--------------------|-----------|------|-----------|-------------------|-----------------|--------------------|---------------|-----|
| | 1,000 lb. | % | 1,000 lb. | % | 1,000 lb. | % | 1,000 lb. | % | 1,000 lb. | % |
| 1939 | 132,719 | 79.5 ¹⁾ | 4,409 | 2.7 | 7,716 | 4.6 ¹⁾ | 22,046 | 13.2 ¹⁾ | 166,890 | 100 |
| 1938 | 180,339 | 74.7 | 7,496 | 3.1 | 14,330 | 5.9 | 39,242 | 16.3 | 241,407 | 100 |
| 1937 | 197,535 | 71.3 | 24,471 | 8.8 | 14,771 | 5.3 | 40,345 | 14.6 | 277,122 | 100 |
| 1936 | 159,174 | 68.2 | 27,117 | 11.6 | 9,259 | 4.0 | 37,920 | 16.2 | 233,470 | 100 |
| 1935 | 190,921 | 70.0 | 27,117 | 9.9 | 12,566 | 4.6 | 42,329 | 15.5 | 272,933 | 100 |
| 1934 | 171,300 | 73.6 | 13,228 | 5.7 | 8,378 | 3.6 | 39,683 | 17.1 | 232,589 | 100 |
| 1933 | 105,161 | 61.6 | 9,480 | 5.5 | 20,724 | 12.1 | 35,495 | 20.8 | 170,860 | 100 |
| 1932 | 126,105 | 58.5 | 10,362 | 4.8 | 34,833 | 16.2 | 44,093 | 20.5 | 215,393 | 100 |
| 1931 | 161,379 | 64.3 | 10,362 | 4.1 | 22,708 | 9.0 | 56,659 | 22.6 | 251,108 | 100 |
| 1930 | 171,961 | 63.8 | 12,346 | 4.6 | 29,522 | 10.9 | 55,777 | 20.7 | 269,406 | 100 |
| 1929 | 172,623 | 61.8 | 5,732 | 2.1 | 29,763 | 10.7 | 70,989 | 25.4 | 279,107 | 100 |
| Average 1924-1928 | 152,119 | 61.7 | 4,630 | 1.9 | 21,605 | 8.8 | 68,123 | 27.6 | 246,477 | 100 |

¹⁾ Calculated data.

which play a preponderant part in the supply of linseed oil: their exports fell from 180 million lb. in 1938 to 133 million lb. in 1939. Belgium has also reduced its exports in 1939, when they reached a very low level. The French 1939 export figures are not known, but there is every reason to believe that exports from France were very small. In 1939 these three countries had contributed nearly 87 per cent. to the world linseed oil exports, of which 79.5 per cent. by the Netherlands, 4.6 per cent. by Belgium and about 3 per cent. by France.

Data regarding the linseed oil import trade in 1939 are not available for most of the chief European importing countries, among which figure Germany, the United Kingdom, Switzerland, Finland and Italy. Normally, Europe absorbs over 2/3 of the world linseed oil exports.

We will now examine the evolution of the production and trade of tung oil and of the perilla oil and seeds, as both these oleaginous products, in competition with linseed oil, are used extensively in industry as driers.

Tung oil. — China is the principal producer as well as chief exporter of this oil. Its export registered a maximum 227 million lb. in 1937. Owing to the war between China and Japan in the last two years, there has been a considerable slump, which was particularly noticeable in 1939, when production was over 50 per cent. lower than in 1938. In that year the tung oil production has been slightly above average. As regards exports, the following table, based on official Chinese statistics, has only a relative importance, because exceptionally high amounts of these exports were temporarily directed "in transit" to Hong-Kong. The chief tung oil importing country is the United States, where,

Exports of Tung Oil from China by countries.

(1,000 lb.)

| Countries | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | Average | |
|-----------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | | | | | 1929-1933 | 1925-1928 |
| 1. — <i>European countries.</i> | | | | | | | | |
| Germany | 661 | 3,307 | 9,490 | 9,480 | 6,393 | 4,850 | 3,527 | 6,834 |
| Belgo-Lux. Un. | 0 | 441 | 661 | 1,102 | 661 | 882 | 441 | 441 |
| Denmark | 220 | 441 | 1,102 | 1,984 | 1,764 | 1,764 | 1,323 | 441 |
| Spain | — | — | 220 | 0 | — | 0 | 0 | 0 |
| France | 0 | 2,425 | 8,157 | 8,157 | 6,834 | 7,055 | 3,307 | 2,205 |
| Italy | 220 | 220 | 1,102 | 220 | 1,102 | 661 | 661 | 661 |
| Norway | 0 | 0 | 1,102 | 1,543 | 1,102 | 1,323 | 661 | 220 |
| Netherlands | 220 | 882 | 1,323 | 3,527 | 4,630 | 6,834 | 6,393 | 3,648 |
| United Kingdom | 1,323 | 4,409 | 8,157 | 8,376 | 8,157 | 6,834 | 11,685 | 7,716 |
| Sweden | 220 | 220 | 1,102 | 1,323 | 882 | 661 | 441 | 220 |
| <i>Total of 1st group</i> | <i>2,864</i> | <i>12,345</i> | <i>32,406</i> | <i>35,714</i> | <i>31,525</i> | <i>30,864</i> | <i>28,439</i> | <i>22,486</i> |

II. — *Extra-European countries.*

| | | | | | | | | |
|-----------------------------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| United States | 1,543 | 12,566 | 141,317 | 137,348 | 108,468 | 90,390 | 94,138 | 85,319 |
| Australia | 0 | 220 | 1,102 | 1,323 | 882 | 441 | 441 | 220 |
| Japan | 0 | 220 | 1,543 | 2,205 | 1,764 | 1,984 | 1,543 | 882 |
| Hong Kong | 66,360 | 123,018 | 46,738 | 13,228 | 19,180 | 19,180 | 12,125 | 11,905 |
| <i>Total of 2nd group</i> | <i>67,903</i> | <i>136,024</i> | <i>190,700</i> | <i>154,104</i> | <i>130,294</i> | <i>111,995</i> | <i>108,247</i> | <i>98,326</i> |
| Other countries. | (1) 3,087 | 5,071 | 3,968 | 1,323 | 1,102 | 1,102 | 661 | 441 |
| <i>General total</i> | <i>73,854</i> | <i>153,440</i> | <i>227,070</i> | <i>191,141</i> | <i>162,921</i> | <i>143,961</i> | <i>137,347</i> | <i>121,253</i> |

(1) Of which 2,646 thousand lb. exported to French Indochina.

United States Imports of Linseed, Tung Oil and Perilla Oil.

| YEARS | Linseed | Tung oil | Perilla oil |
|------------------------------------|---------------|----------------|---------------|
| | 1,000 bushels | 1,000 lb. | 1,000 lb. |
| 1940 | (1) 9,259 | (2) 88,984 | (2) 7,724 |
| 1939 | 16,027 | 78,718 | 51,284 |
| 1938 | 15,366 | 107,365 | 31,747 |
| 1937 | 28,030 | 174,827 | 43,652 |
| 1936 | 15,366 | 134,923 | 117,948 |
| 1935 | 17,578 | 120,152 | 72,312 |
| 1934 | 14,169 | 110,011 | 25,133 |
| <i>Average 1929-1933</i> | <i>14,625</i> | <i>104,059</i> | <i>13,448</i> |
| <i>Average 1924-1928</i> | <i>19,011</i> | <i>93,035</i> | — |

(1) Nine months. — (2) Eight months.

contrary to what happens in the case of linseed oil, it is free of duty. In 1939 the imports of this oil to the United States were still smaller than the hardly average ones of the previous year. Available data for the year 1940 show that there has been a recovery in these imports. In fact, in the first eight months of this year (January-August) the total import figure for the year 1939 had been surpassed by about 10.3 million lb.

Perilla seed and oil. — Perilla seed is grown chiefly in Manchukuo. Its crop, however, has been decreasing for some years, from 508,000 acres in 1935 to 188,000 acres in 1940. Production has also decreased. As against

Export from Manchukuo of Perilla Seed and Oil.

| Year | Seed 1,000 bushels | Oil 1,000 lb. |
|-----------------------------|-----------------------|------------------|
| 1939 (1) | 4,693 | 40,565 |
| 1938 | 3,842 | 29,322 |
| 1937 | 5,031 | 52,250 |
| 1936 | 9,110 | 43,211 |
| 1935 | 5,031 | 25,794 |
| 1934 | 2,543 | 7,275 |
| 1933 | 2,094 | 6,834 |
| 1932 | 1,764 | 7,496 |
| 1931 | 1,835 | 7,496 |
| 1930 | 1,244 | — |
| 1929 | 693 | — |
| Average 1924-1928 | 693 | — |

(1) Ten months: January-October.

14,274,000 bushels in 1935, only 3,728,000 were registered in 1940; last year the production amounted to 8,765,000 bushels. The oil contents of the perilla seed is rather high. In the white variety, which is the most highly appreciated, the yield is about 50 per cent. Nearly the whole of the exportable production of perilla seeds finds its natural outlet in Japan. The export of this product, which cannot stand long transportations, after reaching its maximum level in 1936 with 9,110,000 bushels, decreased considerably in the next two years. Available data for the first ten months in 1939 show a remarkable increase, which is represented by the following figures: 4,693,000 bushels as against 3,283,000 exported during the same period in the preceding year and a total export of 3,842,000 bushels in 1938. An increase was equally registered in the exports of perilla oil from Manchukuo during the first ten months of 1939, when it surpassed the total exports of the preceding year by 11.2 million lb. The chief importing country of perilla oil is the United States, which gets nearly the whole of the exports both from Manchukuo and Japan.

The total perilla oil imports into the United States reached a maximum in 1936, but, following the introduction of a customs duty and on account of trade disturbances caused by the war in the Far East, in 1937 and 1938 there was a big slump; in 1939 there was a new increase, but figures show that in 1940 there has been again a strong regression.

Prices of Linseed.

After the month of November last year the price of linseed of the "La Plata" at London, delivered to Hull, showed a tendency to increase. This tendency continued almost without any interruption till the month of May of this year. The highest quotation was reached in April when the prices of linseed were $\frac{1}{4}$ over the average for the year 1939. In June there was a small slump, which became more marked till the month of October, when prices stabilized at nearly $\frac{1}{4}$ below the average of 1939.

Prices of « La Plata » and « Bold Bombay » Linseed in London.

(Gold francs per quintal)

| | " La Plata " (Delivery Hull) | " Bold Bombay " (Delivery London) |
|-----------------------|---------------------------------|--------------------------------------|
| Annual average: | | |
| 1939 | 16.14 | 19.52 |
| 1938 | 17.03 | 19.45 |
| 1937 | 19.09 | 22.75 |
| 1936 | 16.97 | 20.40 |
| 1935 | 14.35 | 18.24 |
| 1934 | 15.36 | 18.15 |
| 1933 | 15.59 | 19.00 |
| 1932 | 15.02 | 20.56 |
| 1931 | 20.18 | 26.35 |
| 1930 | 37.27 | 43.97 |
| 1929 | 45.29 | 51.47 |
| 1928 | 39.02 | 45.69 |
| Monthly average 1940: | | |
| January | 19.32 | 26.97 |
| February | 18.42 | 23.70 |
| March | 19.28 | 22.73 |
| April | 20.90 | 24.42 |
| May | 20.06 | 24.10 |
| June | 18.23 | 21.61 |
| July | 18.23 | 20.97 |
| August | n. c. | 20.82 |
| September | 14.47 | 20.40 |
| October | 12.81 | 20.36 |

Prices of the variety " Bold Bombay " at London were, on the whole, more stable than those of Argentine linseed. As in the case of the " La Plata " variety, the price of Indian linseed began to go up in November, and this tendency continued till the month of January of this year. The following two months registered a slight decrease; but in the months of April and May the tendency to higher prices was resumed. Later there was a new decrease, and prices in the month from June to October (except for some small fluctuations) stabilized at a level slightly higher than the average for the year 1939.

Conclusion.

Owing to the exceptionally high crops in Argentina, North America and India, the world linseed production during the present season reached a level rarely attained before. On the contrary, the production of tung oil and of perilla seed and oil (and consequently also their export trade) has shown for some years a clear trend to a decrease. Notwithstanding this situation, the disposal of the high linseed crop is going to create a very serious and complex problem in 1941, especially for Argentina and India. Under the present circumstances, the world market does not offer much chance for a disposal of the large available surpluses. War conditions make imports by the European countries, which absorbed nearly $\frac{2}{3}$ of the world linseed exports, well nigh impossible. To this difficulty must be added the danger of a diminished demand on the part of the United States, at least in the course of the first half of 1941, owing to the high linseed production in that country in 1940. If the present abnormal condition of the international trade continues, exports from the principal European linseed oil countries will be further and seriously reduced in the course of the coming year, when the supply of the raw material will have become scarce. The re-armament policy and the intensification of naval constructions in many countries, especially outside of Europe, may somewhat improve the conditions of the market owing to a heavier demand for linseed oil by these industries. But forecasts remain absolutely unfavourable.

A. DI FULVIO.

CURRENT INFORMATION ON COTTON.

Yugoslavia: The production of cotton in 1940 is estimated at 6,918 bales of 478 lb. net weight, against 5,014 in 1939 and an average of 2,514 during the five years ending 1938; percentages, 138.0 and 275.2.

U. R. S. S.: Cotton picking is taking place this year slower than last year in nearly every cotton producing region in the country, and particularly in Ukraine and North Caucasus where abundant rains during the autumn months had somewhat retarded the ripening of bolls. In Uzbekistan, which is the most important cotton producing region in the Union, the purchase plan at the middle of November was considerably delayed. Last year at the same date, 90 per cent. of the delivery plan in Uzbekistan had already been completed. By November 20, 79 per cent. of cotton picking had been done in Kasakstan. In Transcaucasia and in Northern Caucasus, the corresponding percentages are considerably lower. One of the features of the present season is that the greatest part of the cotton will have to be dried up. In Uzbekistan alone the quantity of humid cotton is from three to five times larger than last year.

Argentina: According to the last report of the Junta Nacional del Algodon of the Ministry of Agriculture, communicated by cable to this Institute, the final data of the 1939/40 cotton season are as follows: The area sown to cotton was 902,700 acres as against 1,005,000 acres in 1938-39 and an average of 832,700 acres during the five preceding years; percentages, 89.8 per cent. and 108.4 per cent. The harvested area was 727,750 acres, as against 840,780 in 1938-39 and about 691,900 as the average for the five preceding years; percentages, 86.6 per cent. and 105.2 per cent. The

production of lint cotton is about 362,500 bales of 478 lb., net weight, as against 327,000 bales in 1938-39 and an average of 250,000 bales in the five preceding years; percentages, 110.9 per cent. and 145.0 per cent. The unit yield (nearly 240 lb. of lint cotton per harvested acre) is the highest obtained so far, and is slightly above the unit yield attained in 1935-36. But this year production comes after the more abundant one of 1935-36, which was of about 373,000 bales.

Summary of the Cotton Reports
issued by the Government of the United States, during
the cotton season (August 1-July 31).

| | Provisional estimates for dates indicated 1940-41 | Final estimates | | Percent. 1940-41 | |
|---|---|-----------------|----------------------------------|---------------------|----------------|
| | | 1939-40 | Average 1934-35 to 1938-39 | 1939-40 = 100 | Aver. = 100 |
| Report referring to July 1: | | | | | |
| Area in cultivation (acres) | 25,077,000 | 24,683,000 | 29,132,000 | 101.6 | 86.1 |
| Report referring to August 1: | | | | | |
| Area left for harvest (acres) (1) | 24,616,000 | (2) 23,805,000 | (2) 28,400,000 | 103.4 | 86.7 |
| Crop condition (per cent. of normal) | 72 | 74 | (3) 71 | — | — |
| Production (4) | 11,429,000 | 11,816,000 | 12,713,000 | 96.7 | 89.9 |
| Yield of lint per acre, in lb. | 222.3 | 237.9 | (3) 198.1 | 93.4 | 112.3 |
| Cotton ginned to August 1 (5) | 32,187 | 137,254 | 107,222 | 23.5 | 30.0 |
| Cotton ginned to August 16 (5) | 169,420 | 357,197 | 341,902 | 47.4 | 49.6 |
| Report referred to 1 September: | | | | | |
| Area left for harvest (acres) (6) | 24,406,000 | (2) 23,805,000 | (2) 28,400,000 | 102.5 | 85.9 |
| Crop condition (per cent. of normal) | 74 | 70 | (3) 62 | — | — |
| Production (4) | 12,772,000 | 11,816,000 | 12,713,000 | 108.1 | 100.5 |
| Yield of lint per acre, in lb. | 250.7 | 237.9 | (3) 198.1 | 105.4 | 126.6 |
| Cotton ginned to September 1 (5) | 606,291 | 1,401,691 | 1,424,427 | 43.3 | 42.6 |
| Cotton ginned to September 16 (5) | 1,804,490 | 3,875,703 | 3,410,335 | 46.6 | 52.9 |
| Report referred to October 1: | | | | | |
| Crop condition (per cent. of normal) | 72 | 68 | (3) 63 | — | — |
| Production (4) | 12,741,000 | 11,816,000 | 12,713,000 | 107.8 | 100.2 |
| Yield of lint per acre, in lb. | 250.0 | 237.9 | (3) 198.1 | 105.1 | 126.2 |
| Cotton ginned to October 1 (5) | 3,924,094 | 6,682,066 | 6,012,716 | 58.7 | 65.3 |
| Cotton ginned to October 18 (5) | 7,028,141 | 8,874,291 | 8,379,164 | 79.2 | 83.9 |
| Report referred to November 1: | | | | | |
| Production (4) | 12,847,000 | 11,816,000 | 12,713,000 | 108.7 | 101.1 |
| Yield of lint per acre, in lb. | 252.1 | 237.9 | (3) 198.1 | 106.0 | 127.3 |
| Cotton ginned to November 1 (5) | 9,083,626 | 10,070,112 | 9,765,802 | 90.1 | 93.0 |
| Cotton ginned to November 14 (5) | 10,071,658 | 10,683,371 | 10,705,600 | 94.3 | 94.1 |
| Report referred to December 1: | | | | | |
| Area in cultivation, on July 1 (acres) | 25,073,000 | 24,683,000 | 29,132,000 | 101.6 | 86.1 |
| Area left for harvest (acres) (7) | 24,078,000 | (2) 23,805,000 | (2) 28,400,000 | 101.1 | 84.8 |
| Production (4) | 12,686,000 | 11,816,000 | 12,713,000 | 107.4 | 99.8 |
| Yield of lint per acre, in lb. | 252.4 | 237.9 | (3) 198.1 | 106.1 | 127.4 |
| Average gross weight of running bale, lb. (8) | 514.6 | 511.9 | 511.9 | ... | ... |
| Cotton ginned to December 1 (5) | 10,879,000 | 11,111,422 | 11,455,184 | 97.8 | 94.9 |
| Cotton ginned to December 13 (5) | 11,433,304 | 12,275,427 | 11,768,428 | 101.4 | 97.2 |

(1) Area in cultivation on July 1 less the ten-year (1930-39) average abandonment, from natural causes, 1.9 per cent. — (2) Area actually harvested. — (3) Ten-year (1929-38) average. — (4) In bales of 478 lb. net weight and exclusive of linters. — (5) In running bales, counting round bales as half bales and exclusive of linters. — (6) Per cent. of the acreage in cotton on July 1, 1940, which has been, or will be, abandoned, from natural causes: 2.6. — (7) Per cent. of the acreage in cotton on July 1, 1940, which has been abandoned: 4.0. — (8) Counting round bales as half bales and exclusive of linters.

Egypt: The Egyptian Ministry of Agriculture announces that the cotton ginned in all the ginneries in Egypt since the beginning of the season to the end of October, is as follows, in bales of 478 lb. net weight:

| Varieties | 1940 | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Giza 7 | 164,891 | 131,301 | 110,944 | 162,641 | 136,356 | 84,051 | 59,143 |
| Sakellaridis | 8,134 | 9,277 | 4,899 | 21,068 | 32,189 | 42,144 | 42,239 |
| Other varieties above: | | | | | | | |
| 1 $\frac{3}{8}$ " | 35,092 | 28,223 | 21,610 | 29,192 | 28,536 | 24,407 | 14,296 |
| 1 $\frac{1}{4}$ " | 15,123 | 16,699 | 11,909 | 11,126 | 10,167 | 13,772 | 13,214 |
| 1 $\frac{1}{8}$ " | 525,560 | 429,160 | 421,803 | 511,825 | 573,386 | 507,367 | 449,749 |
| Total | 748,800 | 605,660 | 571,165 | 735,852 | 780,634 | 671,741 | 578,641 |
| Scario | 11,670 | 9,519 | 9,194 | 10,965 | 14,025 | 11,708 | 10,177 |
| Total production (including Scario) (*) | 1,922,559 | 1,815,240 | 1,728,090 | 2,281,223 | 1,887,164 | 1,768,581 | 1,565,583 |

(*) Second estimate.

*Classification of the Egyptian cotton crop by staple length,
in bales of 478 lb. net weight.*

(000's omitted)

| Varieties | 1940 | | 1939 | | 1938 | | 1937 | | 1936 | | 1935 | |
|---|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|
| | Acres | Bales* | Acres | Bales | Acres | Bales | Acres | Bales | Acres | Bales | Acres | Bales |
| 1) Long staple: above 1 $\frac{3}{8}$ " (Sakellaridis) (Giza 7) | 781 (91) (538) | 687 (72) (493) | 812 (72) (625) | 668 (43) (529) | 871 (144) (595) | 562 (61) (405) | 836 (167) (539) | 740 (116) ... | 709 (168) (423) | 592 (108) ... | 702 (309) (280) | 551 (187) ... |
| 2) Long-medium staple: above 1 $\frac{1}{4}$ " | 43 | 44 | 68 | 87 | 54 | 46 | 31 | 32 | 36 | 30 | 57 | 43 |
| 3) Medium staple: above 1 $\frac{1}{8}$ " | 925 | 1,157 | 807 | 1,012 | 927 | 1,084 | 1,186 | 1,469 | 1,036 | 1,223 | 974 | 1,135 |
| Scario | — | 35 | — | 34 | — | 36 | — | 40 | — | 42 | — | 40 |
| Total | 1,749 | 1,923 | 1,687 | 1,801 | 1,852 | 1,728 | 2,053 | 2,281 | 1,781 | 1,887 | 1,733 | 1,769 |

(*) Second estimate. — (1) Maarad, Sakha 4, Sakellaridis, Malaki, Karnak, Giza 7. — (2) Wafeer, Fuadi, Giza 3, etc. — (3) Ashmuni and Zagora.

CURRENT INFORMATION ON HEMP.

Germany: The area sown to hemp this year was 52,000 acres as against 39,000 acres last year; i. e., an increase of 33.0 per cent.

Italy: The Ministry of Agriculture, recognizing the necessity for an increase in the cultivation of hemp in order to fill home needs and meet the demand of the international market, has given the proper instructions to bring up to at least 250,000 acres the area sown to hemp in 1941.

Yugoslavia: The area under hemp in 1940 is estimated at 148,300 acres against 145,000 acres in 1939 and an average of 123,100 acres in 1934 to 1938; percentages, 102.3 and 120.4.

CURRENT INFORMATION ON TOBACCO.

Yugoslavia: Purchases of tobacco by the Government began towards the middle of November in Dalmatia and Croatia, and are continuing without any serious difficulty. The tobacco crop this year appears satisfactory both as to quantity and quality.

United States: According to the most recent estimate area cultivated to tobacco this year is about 1,427,000 acres against 2,020,000 in 1939 and 1,501,000 on the average of the five years ending 1938; percentages 70.6 and 95.1. The corresponding production is estimated at about 1,376,471,000 lb. against 1,858,364,000 lb. and 1,294,694,000 lb.; percentages 74.1 and 106.3.

CURRENT INFORMATION ON OTHER PRODUCTS.**Coffee.**

Brazil: The coffee destruction policy has been accentuated since the beginning of the present commercial season. The quantity of coffee eliminated from the market during the month of October of this year amounted to 515,900 centals, and the total quantity destroyed during the first 4 months of the present commercial season (July 1-October 31), amounts to 1,978,000 centals, as against hardly 998,700 centals destroyed in the course of the semester January-June 1940. The surplus stocks of coffee destroyed in Brazil since 1931 (when the policy of regulated elimination began) and up to October 31, 1940, amount to 93,260,000 centals.

According to the D. N. C. (National Coffee Department) the quantity of coffee available at the November 30, 1940 in all the ports of Brazil amounted to 3,602,000 centals distributed as follows: 2,433,900 centals in the Port of Santos, 597,500 in the Port of Rio de Janeiro, 271,000 in the port of Paranaguá, and the remaining 299,800 centals in the ports of Vitoria, Angra dos Reis, São Salvador and Recife.

Groundnuts.

Argentina: Owing to prevailing low prices, farmers plan to reduce the sowings of groundnuts in the coming season.

United States: According to the most recent estimate area cultivated to groundnuts this year is 1,907,000 acres against 1,859,000 in 1939 and 1,555,000 on the average of the five years ending 1938; percentages, 102.6 and 122.6. The corresponding production is estimated at about 1,612,000 thousand pounds against 1,179,500,000 and 1,188,000,000; percentages, 136.6 and 135.7.

Colza and Sesame.

Romania: Up to November 30, winter colza sowings had been done on only 35,000 acres, i. e., on 20 per cent of the 173,000 acres foreseen by the sowings plan.

Soybeans.

United States: According to the most recent estimate area cultivated to soybeans this year is 4,961,000 acres, against 4,226,000 in 1939 and 2,404,000 on the average of the five years ending 1938; percentages, 117.4 and 206.3. The corresponding production of beans is estimated at about 47,902,000 centals (79,837,000 bushels) against 54,600,000 (91,000,000) and 24,655,000 (41,091,000); percentages, 87.7 and 194.3.

Sunflowers

Yugoslavia: According to the most recent unofficial estimate area cultivated to sunflower this year is about 74,100 acres against 48,500 in 1939 and 19,100 on the average of the five years ending 1938; percentages, 152.9 and 388.3. The corresponding production is estimated at about 992,100 centals, against 601,900 and 262,100; percentages, 164.8 and 378.5.

CURRENT INFORMATION ON FODDER CROPS.

Hungary: Available forage stocks will be sufficient for the feeding of cattle during the winter if straw from spring cereals and maize stalks will be used for the same purpose in a larger measure. Forages are expected to be somewhat scarce in flooded regions.

U. R. S. S.: During the present season hay from natural meadows was cut over an area which is nearly 3,707,000 acres greater than last year. In the collective plants the hay hoarded in silos this year is far above the total quantity hoarded last year. The good yields of forages during the present season are sufficient to cover all needs for the feeding of cattle.

Argentina: In November the condition of artificial meadows and pastures varied from good to excellent.

United States: According to the most recent estimate the area of temporary meadows this year is about 61,592,000 acres, against 58,670,000 in 1939 and 56,100,000 on the average of the five years ending 1938; percentages, 105.0 and 109.8. The corresponding production of tame hay is estimated at about 1,726,240 thousand centals (86,312,000 short tons) against 1,521,980,000 (76,099,000) and 1,405,764,000 (70,288,200); percentages, 113.4 and 122.8.

LIVESTOCK AND DERIVATIVES**CATTLE, PIGS AND POULTRY IN DENMARK *).**

Cattle and poultry in thousands of head.

| CLASSIFICATION | 2 November 1940 | 29 June 1940 | 16 July 1939 | 16 July 1938 | 17 July 1937 | 15 July 1933 |
|----------------------------------|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <i>Cattle</i> | 2,976 | 3,221 | 3,271 | 3,186 | 3,054 | 3,134 |
| Calves under 1 year old | 783 | 861 | 852 | 834 | 763 | 685 |
| Bulls 1 year old and over . . . | 57 | 63 | 68 | 63 | 64 | 78 |
| Steers | 62 | 74 | 78 | 80 | 80 | 59 |
| Heifers 1 year old and over . . | 563 | 634 | 659 | 610 | 603 | 542 |
| Cows and heifers having farrowed | 1,511 | 1,589 | 1,614 | 1,599 | 1,574 | 1,770 |
| <i>Fowls</i> | 11,260 | 21,868 | 32,398 | 27,864 | 26,498 | 25,550 |
| Chicken under 6 months | 1,160 | 9,673 | 18,680 | 15,732 | 13,052 | 13,463 |
| Cocks 6 months old and over . . | 233 | 128 | 188 | 174 | 194 | 314 |
| Hens 6 months old and over . . | 9,866 | 9,673 | 13,530 | 11,958 | 13,252 | 11,773 |

Pigs in thousands of head.

| CLASSIFICATION | 1940 | | | | | | | 1939 | | | | |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Nov. 2 | Sept. 21 | Aug. 10 | June 29 | May 4 | March 23 | Febr. 10 | Dec. 30 | Nov. 18 | Oct. 7 | Aug. 26 | July 15 |
| Boars for breeding. | 13 | 14 | 16 | 17 | 17 | 18 | 17 | 17 | 17 | 18 | 18 | 18 |
| Sows in farrow for first time . . . | 22 | 23 | 30 | 49 | 71 | 89 | 89 | 80 | 63 | 62 | 65 | 76 |
| Other sows in farrow | 108 | 120 | 137 | 146 | 151 | 165 | 169 | 162 | 176 | 189 | 192 | 171 |
| Sows in milk . . . | 60 | 64 | 73 | 90 | 101 | 88 | 80 | 95 | 86 | 81 | 85 | 99 |
| Sows not yet covered (and not for slaughter) | 32 | 38 | 41 | 34 | 26 | 24 | 25 | 21 | 24 | 25 | 27 | 27 |
| Sows for slaughter. | 23 | 26 | 18 | 15 | 17 | 16 | 12 | 12 | 15 | 15 | 9 | 10 |
| <i>Total sows</i> | <i>245</i> | <i>271</i> | <i>299</i> | <i>334</i> | <i>366</i> | <i>382</i> | <i>375</i> | <i>370</i> | <i>364</i> | <i>372</i> | <i>378</i> | <i>383</i> |
| Sucking pigs not weaned | 515 | 539 | 617 | 756 | 807 | 734 | 662 | 804 | 735 | 696 | 731 | 841 |
| Young and adult pigs for slaughter: | | | | | | | | | | | | |
| Weaned pigs under 35 kg. . . | 669 | 755 | 850 | 839 | 690 | 712 | 769 | 749 | 732 | 767 | 839 | 771 |
| Pigs of 35 and under 60 kg. . | 600 | 665 | 690 | 628 | 628 | 686 | 659 | 657 | 697 | 766 | 663 | 641 |
| Fat pigs of 60 kg. and over . | 486 | 497 | 519 | 625 | 626 | 534 | 558 | 537 | 685 | 573 | 535 | 473 |
| <i>Total pigs . . .</i> | <i>2,528</i> | <i>2,741</i> | <i>2,991</i> | <i>3,199</i> | <i>3,134</i> | <i>3,066</i> | <i>3,040</i> | <i>3,134</i> | <i>3,230</i> | <i>3,192</i> | <i>3,164</i> | <i>3,127</i> |

* Rural districts.

CURRENT INFORMATION ON LIVESTOCK AND DERIVATIVES.

Argentina: The health condition of the cattle during the month of November was good, and in some regions even excellent.

CURRENT INFORMATION ON SERICULTURE.

Bulgaria: After the crisis in the rearing of cocoons in the years 1931 and 1932, which was occasioned by the low prices on the world silk market, sericulture in Bulgaria has gradually recovered. The monopoly system introduced in 1938, has encouraged the rearing of cocoons, which lately has shown a tendency to grow again to the level of production that prevailed before the crisis. According to preliminary unofficial data, the cocoon production this year is very near that of last year.

U. R. S. S.: According to the plan, the area to be cultivated to mulberry trees in the three years 1940-42 should be increased by 250,000 acres planted to hedge coppices, and by nearly 96 million mulberry trees.

The silk producing centers are: Uzbekistan, which yields nearly one half of the whole production, Aserbeidjan, Georgia and the other republics of Central Asia and of the Trans Caucasus. Silk production has also greatly developed in Crimea and Ukraine. In the fall of 1940 the area planted to mulberry trees was to have been increased by 47,050 acres.

The production figure of cocoons in 1940 has not been published yet. The 1939 production had reached 51 million lb., with an average yield of nearly 100 lb. by each ounce of eggs under incubation. The average production during the five years 1934-38 was 43,030,000 lb.

LATEST INFORMATION

VEGETAL PRODUCTION.

Yugoslavia: The official definitive estimates of cereals area and production, arrived at Institute with telegram of 27 December, are as follows:

| | Area harvested | | | | | Production | | | | |
|---|----------------|-------|--------------------|-------------------------|-----------------------------|------------|--------|--------------------|-------------------------|-----------------------------|
| | 1940 | 1939 | Average 1934-38 | % 1940 1939 = 100 | Average 1934-38 = 100 | 1940 | 1939 | Average 1934-38 | % 1940 1939 = 100 | Average 1934-38 = 100 |
| | | | | | | | | | | |
| | | | | | | | | | | ooo centsals |
| Wheat | 5,182 | 5,444 | 5,261 | 95.2 | 98.5 | 41,597 | 63,397 | 53,571 | 95.6 | 77.6 |
| Rye . | 630 | 638 | 624 | 98.7 | 101.0 | 4,654 | 5,360 | 4,547 | 86.7 | 102.4 |
| Barley | 1,001 | 1,027 | 1,039 | 97.4 | 96.4 | 8,186 | 9,353 | 8,874 | 87.5 | 92.2 |
| Oats . | 870 | 882 | 895 | 98.7 | 97.2 | 6,347 | 7,678 | 6,906 | 82.7 | 91.9 |
| Maize ¹⁾ 6,986 ²⁾ 6,903 ²⁾ 6,800 | | | | 101.2 | 102.6 ¹⁾ | 96,567 | 89,191 | 103,418 | 108.3 | 93.4 |

(1) Preliminary estimate — (2) Area sown.

TRADE

| COUNTRIES | OCTOBER | | | | THREE MONTHS (August 1-October 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|--|-----------------|-------|------------------|------|------------------------------------|--------|------------------|-------|-------------------------------------|--------------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |
| Wheat. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 1,580 | 0 | 0 | 15 | 3,500 | 0 | 0 | 18,446 | 0 |
| Yugoslavia | ... | 816 | ... | 0 | ... | 2,501 | ... | 0 | 5,431 | 0 |
| United States | 776 | 1,021 | 495 | 602 | 1,929 | 6,080 | 1,284 | 1,585 | 13,134 | 6,173 |
| Argentina | 3,815 | 8,635 | — | — | 14,307 | 26,202 | — | — | 104,945 | — |
| Iraq | 0 | 175 | 0 | 0 | 7 | 399 | 0 | 0 | 1,092 | 0 |
| Turkey | 6 | 0 | — | — | 53 | 51 | — | — | 1,402 | — |
| Wheat Flour. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Yugoslavia | ... | 8 | ... | 0 | ... | 11 | ... | 0 | 325 | 0 |
| United States | 1,309 | 1,221 | 31 | 40 | 3,018 | 3,797 | 78 | 91 | 11,758 | 129 |
| Argentina | 86 | 156 | — | — | 302 | 529 | — | — | 1,951 | — |
| Iraq | 0 | 13 | 0 | 0 | 11 | 34 | 0 | 0 | 176 | 0 |
| Turkey | 0 | 0 | — | — | 0 | 1 | — | — | 1 | — |
| Total Wheat and Flour †. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| | NET EXPORTS (*) | | NET IMPORTS (**) | | NET EXPORTS (*) | | NET IMPORTS (**) | | N. Ex. (*) | N. Imp. (**) |
| Romania | 0 | 1,580 | — | — | 15 | 3,500 | — | — | 18,449 | — |
| Yugoslavia | ... | 827 | — | — | ... | 2,516 | — | — | 5,864 | — |
| United States | 1,985 | 1,993 | — | — | 4,504 | 9,436 | — | — | 22,467 | — |
| Argentina | 3,930 | 8,843 | — | — | 14,710 | 26,908 | — | — | 107,547 | — |
| Iraq | 0 | 193 | — | — | 22 | 445 | — | — | 1,327 | — |
| Turkey | 6 | 0 | — | — | 53 | 52 | — | — | 1,404 | — |
| Rye. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 229 | 0 | 0 | 13 | 447 | 0 | 0 | 2,198 | 0 |
| United States | 1 | 0 | 1 | 0 | 135 | 0 | 1 | 0 | 411 | 0 |
| Argentina | 34 | 276 | — | — | 182 | 856 | — | — | 5,664 | — |
| Turkey | 0 | 0 | — | — | 0 | 26 | — | — | 195 | — |

(*) Excess of exports over imports. — (**) Excess of imports over exports.

(†) Flour reduced to grain on the basis of the coefficient: 1,000 centals of flour = 1,333.333 centals of grain.

| COUNTRIES | OCTOBER | | | | THREE MONTHS (August 1-October 31) | | | | TWELVE MONTHS (August 1-July 31) | |
|-----------|---------|------|---------|------|------------------------------------|------|---------|------|-------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |

Barley. Thousand centals (1 cental = 100 lb.).*Exporting Countries:*

| | | | | | | | | | | |
|---------------------|-----|-----|-----|----|-----|-------|-----|-----|-------|-----|
| Romania | 0 | 568 | 0 | 0 | 0 | 2,215 | 0 | 0 | 2,411 | 0 |
| United States . . . | 19 | 417 | 227 | 29 | 94 | 1,085 | 404 | 121 | 1,645 | 290 |
| Argentina | 153 | 261 | — | — | 621 | 588 | — | — | 8,853 | — |
| Iraq | 13 | 713 | 0 | 0 | 129 | 1,350 | 0 | 0 | 5,167 | 0 |
| Turkey | 0 | 0 | — | — | 0 | 156 | — | — | 1,037 | — |

Oats. — Thousand centals (1 cental = 100 lb.).*Exporting Countries:*

| | | | | | | | | | | |
|---------------------|----|-----|-----|-----|-----|-------|-----|-----|-------|-------|
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United States . . . | 3 | 3 | 129 | 150 | 7 | 9 | 539 | 409 | 65 | 3,635 |
| Argentina | 20 | 581 | — | — | 100 | 1,580 | — | — | 8,397 | — |
| Turkey | 0 | 0 | — | — | 0 | 6 | — | — | 6 | — |

Maize. — Thousand centals (1 cental = 100 lb.).

TWELVE MONTHS (November 1-October 31) TWELVE MONTHS
(Nov. 1-Oct. 31)

Exporting Countries:

| | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
|---------------------|---------|---------|---------|---------|---------|---------|
| Romania | 164 | 91 | 0 | 0 | 13,624 | 12,014 |
| Yugoslavia | ... | 6 | ... | 0 | ... | 2,334 |
| United States . . . | 3,072 | 3,089 | 158 | 18 | 24,595 | 19,783 |
| Argentina | 1,811 | 4,449 | — | — | 46,074 | 75,057 |
| Iraq | 0 | 0 | — | — | 1 | 3 |

Rice. — Thousand centals (1 cental = 100 lb.).

TEN MONTHS (January 1-October 31) TWELVE MONTHS
(January 1-Dec. 31)

Exporting Countries:

| | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
|---------------------|------|------|------|------|-------|-------|
| United States . . . | 250 | 305 | 21 | 10 | 2,681 | 2,886 |
| Iraq | 15 | 0 | 0 | 0 | 27 | 11 |

Importing Countries:

| | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
|--------------------|------|------|------|------|------|------|
| Romania | — | — | 0 | 21 | — | — |
| Yugoslavia | ... | 0 | ... | 6 | ... | 0 |

| COUNTRIES | OCTOBER | | | | TEN MONTHS (January 1-October 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|--|---------|--------|---------|--------|-----------------------------------|--------|---------|--------|--------------------------------------|---------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Linseed. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 2 | 3 | 2 |
| United States . . . | — | — | 394 | 490 | — | — | 5,580 | 8,246 | — | 8,976 |
| Argentina | 730 | 1,093 | — | — | 15,170 | 23,673 | — | — | 26,082 | — |
| Iraq | 6 | 18 | — | — | 53 | 59 | — | — | 63 | — |
| Cotton. — Thousand centals (1 cental = 100 lb.). | | | | | | | | | | |
| THREE MONTHS (August 1-October 31) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | 1939-40 | 1939-40 |
| United States . . . | 1,033 | 4,676 | 80 | 68 | 1,862 | 9,272 | 150 | 185 | 32,690 | 841 |
| Argentina | 0 | 11 | — | — | 97 | 155 | — | — | 573 | — |
| Iraq | 0 | 7 | 0 | 0 | 2 | 15 | 1 | 1 | 57 | 3 |
| Turkey | 9 | 4 | — | — | 23 | 16 | — | — | 129 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 6 | 18 | 0 | 0 | 26 | 60 | 0 | 306 |
| Yugoslavia | ... | 0 | ... | 34 | ... | 0 | ... | 79 | 0 | 454 |
| Wool. — Thousand lb. | | | | | | | | | | |
| TWO MONTHS (Sept. 1-October 31) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | 1939-40 | 1939-40 |
| Argentina (a) | 12,009 | 10,565 | — | — | 20,329 | 16,017 | — | — | 203,232 | — |
| Argentina (b) | 5,465 | 3,741 | — | — | 9,341 | 7,571 | — | — | 71,975 | — |
| Iraq | 4,639 | 2,800 | 0 | 0 | 4,786 | 4,522 | 0 | 20 | 16,495 | 62 |
| Turkey | 231 | 0 | — | — | 3,223 | 1,409 | — | — | 6,923 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Romania | 0 | 0 | 0 | 9 | 0 | 0 | 4,120 | 55 | 0 | 2,972 |
| Yugoslavia | ... | 0 | ... | 179 | ... | 0 | ... | 538 | 0 | 5,977 |
| United States . . . | 0 | 4 | 33,980 | 19,831 | 0 | 7 | 55,810 | 49,456 | 485 | 312,037 |
| Butter. — Thousand lb. | | | | | | | | | | |
| TEN MONTHS (January 1-October 31) | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | 1939 | 1939 |
| Romania | 0 | 101 | 0 | 0 | 315 | 811 | 0 | 0 | 924 | 0 |
| United States . . . | 273 | 282 | 90 | 159 | 2,388 | 1,821 | 1,001 | 939 | 2,310 | 1,107 |
| Argentina | 1,089 | 2,105 | — | — | 20,276 | 13,287 | — | — | 19,745 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Iraq | 0 | 0 | 7 | 0 | 0 | 2 | 33 | 35 | 2 | 40 |

(a) Unwashed wool. — (b) Washed wool.

| COUNTRIES | OCTOBER | | | | TEN MONTHS (January 1-October 31) | | | | TWELVE MONTHS (January 1-Dec. 31) | |
|-------------------------------|---------|---------|---------|---------|-----------------------------------|------------|---------|---------|-----------------------------------|-----------|
| | EXPORTS | | IMPORTS | | EXPORTS | | IMPORTS | | EXPORTS | IMPORTS |
| | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1940 | 1939 | 1939 | 1939 |
| Cheese. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Romania | 0 | 24 | 0 | 4 | 300 | 130 | 24 | 42 | 353 | 64 |
| Argentina | 1,625 | 710 | — | — | 7,659 | 4,817 | — | — | 5,474 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| United States . . . | 214 | 117 | 2,092 | 11,638 | 1,733 | 1,230 | 27,765 | 49,251 | 1,479 | 59,075 |
| Iraq | 2 | 0 | 2 | 4 | 2 | 15 | 29 | 49 | 15 | 60 |
| Cacao. — Thousand lb. | | | | | | | | | | |
| <i>Importing Countries:</i> | | | | | | | | | | |
| | | | | | TWELVE MONTHS (Oct. 1-Sept. 30) | | | | TWELVE MONTHS (Oct. 1-Sept. 30) | |
| | | | | | 1939-40 | 1938-39 | 1939-40 | 1938-39 | 1938-39 | 1938-39 |
| Romania | — | — | 0 | 265 | — | — | 2,355 | 3,783 | — | — |
| United States . . . | — | — | 67,318 | 60,962 | — | — | 665,635 | 583,184 | — | — |
| Tea. — Thousand lb. | | | | | | | | | | |
| <i>Importing Countries:</i> | | | | | | | | | | |
| | | | | | FOUR MONTHS (July 1-October 31) | | | | TWELVE MONTHS (July 1-June 30) | |
| | | | | | 1940 | 1939 | 1940 | 1939 | 1939-40 | 1939-40 |
| Romania | — | — | 4 | 95 | — | — | 68 | 428 | — | 833 |
| United States . . . | — | — | 9,030 | 7,652 | — | — | 31,306 | 29,258 | — | 100,075 |
| Iraq | 0 | 0 | 533 | 496 | 0 | 0 | 2,097 | 1,911 | 7 | 6,748 |
| Turkey | — | — | 97 | 165 | — | — | 439 | 765 | — | 2,357 |
| Coffee. — Thousand lb. | | | | | | | | | | |
| <i>Exporting Countries:</i> | | | | | | | | | | |
| Brasil | 138,063 | 272,821 | — | — | 499,334 | 807,287 | — | — | 1,996,220 | — |
| Colombia | ... | ... | — | — | (1) 135,680 | (1) 94,008 | — | — | 496,727 | — |
| <i>Importing Countries:</i> | | | | | | | | | | |
| Romania | — | — | 487 | 604 | — | — | 1,609 | 2,072 | — | 5,053 |
| Yugoslavia | — | — | ... | 1,058 | — | — | ... | 5,172 | — | 14,692 |
| United States . . . | 688 | 1,512 | 164,571 | 193,855 | 3,463 | 4,187 | 631,362 | 617,149 | 12,253 | 2,043,624 |
| Iraq | 0 | 0 | 110 | 168 | 0 | 0 | 514 | 734 | 0 | 2,776 |
| Turkey | — | — | 855 | 1,237 | — | — | 3,589 | 3,876 | — | 13,334 |

(1) Up to September 30.

STOCKS**Commercial cereals in store in Canada and the United States.**

| PRODUCTS AND LOCATION | Friday or Saturday nearest 1st of month ⁽¹⁾ | | | | |
|---|--|---------------|--------------|---------------|---------------|
| | December 1940 | November 1940 | October 1940 | December 1939 | December 1938 |
| | thousand cents | | | | |
| WHEAT: | | | | | |
| Canadian in Canada | ... | 245,614 | 224,108 | 189,178 | 97,425 |
| U. S. in Canada | ... | 695 | 469 | 488 | 333 |
| U. S. in the United States | 99,952 | 105,834 | 111,158 | 85,192 | 81,722 |
| Canadian in the United States | 26,428 | 21,980 | 20,401 | 20,636 | 4,967 |
| TOTAL | ... | 374,123 | 356,136 | 295,494 | 184,447 |
| RYE: | | | | | |
| Canadian in Canada | ... | 1,645 | 1,538 | 1,243 | 1,071 |
| U. S. in Canada | ... | 13 | 13 | 13 | 13 |
| U. S. in the United States | 4,288 | 4,543 | 4,765 | 5,574 | 4,537 |
| Canadian in the United States | 1,872 | 1,873 | 1,873 | 528 | 24 |
| TOTAL | ... | 8,074 | 8,189 | 7,358 | 5,645 |
| BARLEY: | | | | | |
| Canadian in Canada | ... | 2,973 | 2,933 | 3,501 | 3,414 |
| U. S. in Canada | ... | 0 | 0 | 2 | 6 |
| U. S. in the United States | 4,647 | 5,458 | 5,356 | 9,651 | 7,776 |
| Canadian in the United States | 192 | 329 | 414 | 735 | 15 |
| TOTAL | ... | 8,760 | 8,703 | 13,889 | 11,209 |
| OATS: | | | | | |
| Canadian in Canada | ... | 2,653 | 1,763 | 3,042 | 2,800 |
| U. S. in Canada | ... | 7 | 16 | 68 | 485 |
| U. S. in the United States | 2,140 | 2,270 | 2,671 | 4,224 | 5,656 |
| Canadian in the United States | 201 | 177 | 176 | 374 | 0 |
| TOTAL | ... | 5,107 | 4,626 | 7,708 | 8,941 |
| MAIZE: | | | | | |
| U. S. in Canada | ... | 2,954 | 1,721 | 1,757 | 3,167 |
| Argentine in Canada | ... | ... | ... | 1 | 17 |
| South African in Canada | ... | ... | ... | 936 | 236 |
| Australian in Canada | ... | ... | ... | 0 | 124 |
| U. S. in the United States | 36,674 | 33,216 | 25,148 | 21,393 | 26,121 |
| TOTAL | ... | ... | ... | 24,087 | 29,661 |

⁽¹⁾ Friday for Canada, Saturday for the United States.**Commercial cereals and oilseeds in store in Argentina.**

| PRODUCTS AND LOCATION | First day of month | | | | |
|--------------------------------------|--------------------|--------------|----------------|---------------|---------------|
| | November 1940 | October 1940 | September 1940 | November 1939 | November 1938 |
| | thousand cents | | | | |
| Wheat in the ports | 6,132 | 8,620 | 10,857 | *) | 4,087 |
| Wheat in other positions | 7,023 | 11,310 | 15,096 | *) | 12,062 |
| TOTAL | *) 13,155 | *) 19,930 | *) 25,953 | *) | 16,149 |
| Rye | 4,381 | 4,521 | 4,679 | 1,044 | 179 |
| Barley | 4,073 | 4,259 | 4,538 | 711 | 319 |
| Oats | 2,899 | 3,052 | 3,155 | 2,404 | 617 |
| Maize in the ports | 5,794 | 5,762 | 5,277 | 6,226 | 3,429 |
| Maize in other positions | 4,577 | 4,256 | 10,783 | 6,454 | 9,330 |
| TOTAL | *) 10,371 | *) 10,018 | 16,060 | 12,680 | 12,759 |
| Canaryseed | 515 | 517 | 512 | 267 | 252 |
| Linseed in the ports | 2,657 | 2,886 | 3,115 | 1,139 | 1,081 |
| Linseed in other positions | 2,013 | 2,274 | 2,475 | 497 | 1,623 |
| TOTAL | 4,670 | 5,160 | 5,590 | 1,636 | 2,704 |
| Sunflowerseed | 2,062 | 2,414 | 2,559 | 647 | 1,357 |

⁽¹⁾ Including 11,341 thousand cents of 1939-40 crop. — ⁽²⁾ Including 16,423 thousand cents of 1939-40 crop. — ⁽³⁾ Including 20,489 thousand cents of the 1939-40 crop. — ⁽⁴⁾ Figures for wheat in store have been withheld by governmental order. — ⁽⁵⁾ Not including stocks the property of the "Junta Reguladora de Granos".

Cotton stocks on hand in the United States.

| LOCATION | Last day of month | | | | |
|---|-------------------|--------------|----------------|---------------|---------------|
| | November 1940 | October 1940 | September 1940 | November 1939 | November 1938 |
| | thousand cents | | | | |
| In consuming establishments | 8,267 | 6,654 | 3,873 | 8,766 | 8,426 |
| In public storage and at compresses . . . | 72,453 | 68,129 | 52,826 | 76,182 | 76,675 |
| TOTAL . . . | 80,720 | 74,783 | 56,698 | 84,948 | 85,101 |

PRICES**PRICES FOR CEREALS OF THE NEW CROP.**

We are continuing below our information about prices of cereals of the new crop in certain countries.

Netherlands.

On the basis of the system created in 1933, the producer's price for wheat of the 1940 crop has been fixed at florins 11.50 per quintal to be paid during the first week of September 1940. As from September 8 this basic price is increased by 3 Dutch cents per week.

Switzerland.

The system of price fixation for bread-cereals, mentioned in our latest Crop Report (November issue, p. 701) has been completed by obliging the cereal growers to deliver their product to the State warehouses. Furthermore the Federal Department for Public Welfare has prescribed, by Order of November 25, 1940, in force as from December 1, that home grown barley, oats and maize, harvested in 1940 or kept over from preceding years, has to be delivered to the Confederation.

Every producer or holder of these cereals must indicate his stocks to the Wheat Administration not later than December 15. Producers are allowed to retain for the needs of their household and their agricultural holding (sowings, feeding of animals, etc.) such quantities may be necessary until the moment that the 1941 crop becomes available.

Purchasing prices are fixed as follows:

| | |
|------------------|--------------|
| Barley | francs 38.00 |
| Oats | .. 37.00 |
| Maize | .. 40.00 |

These prices are per net quintal of merchandise, f.o.r. producer's station or at a warehouse or mill near the producer's holding; they are valid also for cereals kept from preceding years.

PRICES BY PRODUCTS.

A) — Spot quotations. ¹⁾

| DESCRIPTION | Dec. 13, 1940 | Dec. 6, 1940 | Nov. 29, 1940 | Nov. 22, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|---|---------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|------------------------------------|----------------------------------|---------------------------------|--------------------------------|
| | | | | | Nov. 1940 | Dec. 1939 | Dec. 1938 | 1939-40 ²⁾ | 1938-39 ³⁾ |
| Wheat | | | | | | | | | |
| Winnipeg: No. 1 Manitoba (cents p. 60 lb.) | ... | ... | ... | ... | ⁴⁾ ... | 81 ¹ / ₈ | 60 ³ / ₈ | 76 | 62 |
| Chicago: No. 2 Hard Winter (cents p. 60 lb.) | 91 | 91 | 92 | 94 | 90 | 101 ¹ / ₈ n. | 67 ¹ / ₈ | 92 ¹ / ₈ | 70 ³ / ₈ |
| Minneapolis (cents per 60 lb.): | | | | | | | | | |
| No. 1 Northern | 85 | 84 ¹ / ₈ | 85 ¹ / ₈ | 85 ¹ / ₈ | 85 ¹ / ₈ | 100 | 73 ¹ / ₈ | 91 ¹ / ₈ | 74 ⁵ / ₈ |
| No. 2 Amber Durum | 76 ³ / ₈ | 76 ¹ / ₈ | 76 ³ / ₈ | 77 ³ / ₈ | 76 | 88 | 65 ¹ / ₈ | 80 ¹ / ₈ | 68 ³ / ₈ |
| New York: No. 2 Hard Winter (f.o.b. cents per 60 lb.) | 109 ¹ / ₈ | 109 | 108 ¹ / ₈ | 107 ⁷ / ₈ | 107 ¹ / ₈ | 122 ⁷ / ₈ | 80 ¹ / ₈ | 112 ¹ / ₈ | 84 ³ / ₈ |
| Buenos Aires (a): No. 2 Hard, 80 kg. per hl. (paper pesos per 100 kg.) | 6,75 | 6,75 | n. q. | n. q. | ⁵⁾ * 6.60 | 7.91 * | 6.05 | 7.66 | 6.89 |
| Rye. | | | | | | | | | |
| Winnipeg: No. 2 rye (cents p. 56 lb.) | ... | ... | ... | ... | ⁶⁾ ... | 72 | 39 ⁷ / ₈ | 54 ¹ / ₈ | 40 ³ / ₈ |
| Minneapolis: No. 2 rye (cents p. 56 lb.) | ... | ... | ... | ... | ... | 65 | 42 ³ / ₈ | 56 ¹ / ₈ | 44 |
| Barley. | | | | | | | | | |
| Winnipeg: No. 4 West. (cents p. 48 lb.) ⁷⁾ | ... | ... | ... | ... | ⁷⁾ ... | 45 ¹ / ₈ | 34 ³ / ₈ * | 43 | 34 ¹ / ₈ |
| Chicago: Feeding (on sample; cents p. 48 lb.) | 47 | 47 | 47 | 43 | 43 ³ / ₈ | 41 ¹ / ₈ | 40 ³ / ₈ | 42 ¹ / ₈ | 40 ⁴ / ₈ |
| Minneapolis: No. 2 Feeding (cents p. 48 lb.) | 42 ¹ / ₂ | 42 ¹ / ₂ | 42 ¹ / ₈ | 42 ³ / ₈ | 41 ³ / ₈ | 46 | 40 ¹ / ₈ | 45 | 40 ¹ / ₈ |
| Oats. | | | | | | | | | |
| Winnipeg: No. 2 White (cents per 34 lb.) | ... | ... | ... | ... | ⁸⁾ ... | 38 ³ / ₈ | 28 ³ / ₈ | 35 ¹ / ₈ | 29 |
| Chicago: No. 2 White (cents per 32 lb.) | 40 ¹ / ₈ | 39 ¹ / ₈ | 41 ¹ / ₈ | 40 | 39 ³ / ₈ | 41 ¹ / ₈ | 31 ³ / ₈ | 39 | 30 ¹ / ₈ |
| Buenos Aires (a): No. 2 White, 40 kg. per hl. (paper pesos p. 100 kg.) | 3.95 | 3.90 | 3.95 | 3.95 | ⁹⁾ * 3.87 | 5.22 | 4.81 | 5.17 | 4.81 |
| Maize. | | | | | | | | | |
| Chicago: No. 3 Yellow (cents p. 56 lb.) | 61 | 61 | 63 | 64 ¹ / ₈ | 63 ³ / ₈ | 56 ¹ / ₈ | 51 ¹ / ₈ | 53 ¹ / ₈ | 51 ¹ / ₈ |
| Buenos Aires (a): Yellow Plata (paper pesos per 100 kg.) | n. q. | n. q. | 2.85 | 3.20 | ¹⁰⁾ 3.04 | 6.96 | 7.29 | 6.11 | 6.89 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal.
— (a) Thursday prices.

¹⁾ In relation to Government price fixing, numerous series are omitted from this table; notes concerning them have been given in various issues of the Crop Report: Germany: Feb. 1940, p. 142, and July 1940, p. 478; Denmark: Nov. 1940, p. 697; Spain: Nov. 1940, p. 698, France: Sept. 1940, p. 600, and Nov. 1940, p. 699; Hungary: Sept. 1940, p. 600, and Nov. 1940, p. 699; Italy: Dec. 1939, p. 1163, and Sept. 1940, p. 601; Netherlands: Dec. 1940, p. 755; Romania: Sept. 1940, p. 601, and Nov. 1940, p. 700; United Kingdom: Nov. 1939, p. 1060; Switzerland, Nov. 1940, p. 697, and Dec. 1940, p. 755. — ²⁾ Oct. 1939-May 1940: No. 2 Feeding barley; subsequently: Barley N. 3 Western. — ³⁾ Commercial season: August-July; for Maize: May-April. — ⁴⁾ Oct. 25: 70 ¹/₈; Oct. 18: 70 ¹/₈; Oct. average: 70 ¹/₈. — ⁵⁾ Nov. 14 and 7: 6.60; Oct. 31: 6.50; Oct. 24: 5.95; Oct. 17: 5.90; Oct. average: 6.18. — ⁶⁾ Oct. 18: 44. — ⁷⁾ Oct. 18: 37 ¹/₈. — ⁸⁾ Oct. 18: 33 ¹/₈. — ⁹⁾ Nov. 14 and 7: 3.80; Oct. 31: 3.90; Oct. 24 and 17: 3.60; Oct. average: 3.59. — ¹⁰⁾ Nov. 14: 3.10; Nov. 7: 3.00; Oct. 31: 3.10; Oct. 24: 3.20; Oct. 17: 3.25; Oct. average: 3.33.

| DESCRIPTION | Dec. 13, 1940 | Dec. 6, 1940 | Nov. 29, 1940 | Nov. 22, 1940 | MONTHLY AVERAGES | | | YEARLY AVERAGES | |
|--|---------------------|--------------------|---------------------|---------------------|---------------------|--------------|--------------|---------------------------|---------------------------|
| | | | | | Nov. 1940 | Dec. 1939 | Dec. 1938 | 1939 | 1938 |
| Linseed. | | | | | | | | | |
| Buenos Aires (a): Current quality, 4 % impurities (paper pesos p. 100 kg.). | 9.37 | 9.37 | n. q. | n. q. | ^a) 9.27 | 17.22 | 13.55 | 15.12 | 14.31 |
| London (c.i.f., shipping current or fol- lowing month; £ per long ton): | | | | | | | | | |
| La Plata | 11-12-6 | 11-10-0 | 11-10-0 | n. q. | *10-11-3 | 15-15-6 | 10-18-6 | *12- 2-3 | 11-10-11 |
| Bombay | 19-12-6 | 19-12-6 | 19-12-6 | 19- 7-6 | 17-16-0 | 21-19-0 | 12-13-9 | *14-10-3 | 13- 3-9 |
| Minneapolis No. 1 Northern (cts. p. 56 lb.). | 162 1/2 | 161 | 161 | 162 | 157 1/2 | 204 1/2 | 190 1/2 | 180 | 190 |
| | | | | | | | | 1939-40 ^a) | 1938-39 ^a) |
| Cotton. | | | | | | | | | |
| New Orleans: Middling (cents p. lb.). | 9.95 | 9.99 | 9.84 | 9.93 | 9.82 n. | 10.64 | 8.49 | n. 10.03 | 8.75 |
| New York: Middling (cents per lb.). | 10.40 | 10.43 | 10.26 | 10.35 | 10.15 n. | 10.94 | 8.73 | n. 10.34 | 9.00 |
| Liverpool (pence per lb.): | | | | | | | | | |
| Middling, super good | ... | ... | ... | ... | ... | n. 9.04 | 5.85 | * 8.05 | 5.88 |
| Middling | 8.37 | 8.54 | 8.41 | 8.38 | 8.25 | 8.44 | 5.15 | 7.47 | 5.17 |
| São Paulo, g.f. | | | | | | 8.59 | 5.15 | * 7.44 | 5.14 |
| Broach, good staple, f.g. (1) | n. 6.91 | n. 6.96 | n. 6.85 | n. 6.77 | n. 6.60 | n. 7.42 | n. 3.96 | n. 6.36 | * n. 3.92 |
| C.P. Oomra, good staple, superfine (1) | 7.21 | 7.26 | 7.15 | 7.11 | 6.96 | n. 7.68 | 4.09 | 6.50 | * 4.11 |
| Giza 7, f.g.f. | 12.39 | 12.43 | 12.42 | 12.64 | 12.82 | 9.84 | 7.69 | 9.58 | 7.22 |
| Upper Egyptian, f.g.f. | 11.59 | 11.64 | 11.60 | 11.90 | 12.09 | 9.43 | 6.11 | 9.32 | 6.00 |

B) — Quotations for future delivery.

| DESCRIPTION | Dec. 13, 1940 | Dec. 6, 1940 | Nov. 29, 1940 | Nov. 22, 1940 | MONTHLY AVERAGES | | | | |
|--|---------------------|--------------------|---------------------|---------------------|------------------|--------------|--------------|--------------|--------------|
| | | | | | Nov. 1940 | Dec. 1939 | Dec. 1938 | Dec. 1937 | Dec. 1936 |
| Wheat. | | | | | | | | | |
| Winnipeg (cents p. 60 lb.): | | | | | | | | | |
| delivery December | 73 1/2 | 72 1/4 | 72 1/2 | 71 1/2 | * 72 1/2 | 81 1/2 | 60 3/4 | 125 | 122 1/2 |
| " May | 77 1/2 | 76 1/2 | 76 1/2 | 76 1/2 | 76 1/2 | 85 1/2 | 62 1/2 | 116 1/2 | 122 1/2 |
| " July | 79 1/2 | 78 1/2 | 78 1/2 | 77 1/2 | 78 1/2 | 86 1/2 | 63 1/2 | 111 | 119 1/2 |
| Chicago (cents p. 60 lb.): | | | | | | | | | |
| delivery December | 89 1/2 | 89 | 88 1/2 | 87 1/2 | 87 1/2 | 100 1/2 | 63 1/2 | * 95 1/2 | * 132 1/2 |
| " May | 85 1/2 | 85 1/2 | 86 1/2 | 87 | 86 1/2 | 98 1/2 | 67 1/2 | 91 1/2 | 129 1/2 |
| " July | 80 1/2 | 81 | 82 1/2 | 83 1/2 | 82 1/2 | 96 1/2 | 67 | 85 1/2 | 114 1/2 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery November | — | — | — | 6.75 | * 6.52 | — | — | — | — |
| " December | — | 6.75 | 6.75 | 6.75 | 6.58 | — | — | * 11.61 | — |
| " February | 6.81 | 6.82 | 6.79 | 6.79 | * 6.79 | * 8.10 | 7.00 | 11.24 | 10 7/1 |
| " March | 6.84 | 6.85 | — | — | — | 8.24 | — | 11.29 | — |
| Rye. | | | | | | | | | |
| Winnipeg (cents p. 56 lb.): | | | | | | | | | |
| delivery December | 45 1/2 | 45 1/2 | 46 1/2 | 46 1/2 | * 46 1/2 | 72 | 39 1/2 | 75 1/2 | 100 1/2 |
| " May | 49 1/2 | 48 1/2 | 49 1/2 | 49 1/2 | 49 1/2 | 74 1/2 | 41 1/2 | 77 1/2 | 100 1/2 |
| " July | 50 1/2 | 49 1/2 | — | — | — | 73 1/2 | 42 1/2 | 76 1/2 | 98 1/2 |
| Chicago (cents p. 56 lb.): | | | | | | | | | |
| delivery December | 43 | 42 1/2 | 43 1/2 | 44 1/2 | 47 1/2 | * 62 1/2 | * 41 1/2 | * 68 1/2 | * 109 |
| " May | 47 | 47 1/2 | 48 1/2 | 49 1/2 | 49 1/2 | 49 1/2 | 45 1/2 | 70 1/2 | 107 1/2 |
| " July | 47 1/2 | 48 1/2 | 49 1/2 | 50 1/2 | 50 1/2 | 66 1/2 | 45 1/2 | 66 1/2 | 101 1/2 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted. — n. = nominal. — (a) Thursday prices.

(1) As from March 15, 1939: "fair staple". — (1) Nov. 14: 9.35; Nov. 7: 9.00; Oct. 31 and 24: 8.70; Oct. 17: 8.80; Oct. average: 8.84. — (1) Commercial season: August-July.

| DESCRIPTION | Dec. 13, 1940 | Dec. 6, 1940 | Nov. 29, 1940 | Nov. 22, 1940 | MONTHLY AVERAGES | | | | |
|--|--------------------------------|--------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|----------------------------------|---------------------------------|
| | | | | | Nov. 1940 | Dec. 1939 | Dec. 1938 | Dec. 1937 | Dec. 1936 |
| Barley. | | | | | | | | | |
| Winnipeg (cents p. 48 lb.): | | | | | | | | | |
| delivery December | 43 ³ / ₄ | 42 ³ / ₄ | 42 ³ / ₄ | 43 ³ / ₄ * | 44 ³ / ₄ | 49 | 37 ⁷ / ₈ * | 59 | 80 ¹ / ₂ |
| " May | 44 ¹ / ₂ | 43 ¹ / ₂ | 42 ⁷ / ₈ | 42 ³ / ₄ * | 42 ⁷ / ₈ | 50 ¹ / ₂ | 38 ⁵ / ₈ | 59 ¹ / ₂ | 71 ¹ / ₂ |
| " July | 42 ³ / ₄ | 41 ¹ / ₂ | n. q. | 41 ¹ / ₂ * | 42 | 49 ³ / ₄ | 37 ⁷ / ₈ | 57 ¹ / ₂ | 68 ¹ / ₂ |
| Minneapolis (cents p. 48 lb.): | | | | | | | | | |
| delivery December | ... | ... | ... | ... | ... | 40 ¹ / ₂ * | 32 ¹ / ₂ * | 46 ¹ / ₂ | 86 |
| " May | ... | ... | ... | ... | ... | 42 ³ / ₄ * | 34 ¹ / ₂ | 46 ¹ / ₂ | 79 ¹ / ₂ |
| Oats. | | | | | | | | | |
| Winnipeg (cents p. 34 lb.): | | | | | | | | | |
| delivery December | 33 ¹ / ₄ | 32 ¹ / ₄ | 33 ⁵ / ₈ | 33 ¹ / ₄ * | 33 ³ / ₄ | 38 ¹ / ₂ | 28 ¹ / ₂ | 47 ³ / ₄ | 50 ¹ / ₂ |
| " May | 32 ¹ / ₄ | 31 ⁵ / ₈ | 32 ⁷ / ₈ | 32 ¹ / ₄ | 32 ¹ / ₂ | 38 | 29 | 46 ¹ / ₂ | 50 ¹ / ₂ |
| " July | 31 ¹ / ₄ | 30 ³ / ₄ | 31 ⁵ / ₈ | 31 | 31 ³ / ₄ | 37 ³ / ₄ | 28 ³ / ₄ | 43 ³ / ₄ | 49 ¹ / ₂ |
| Chicago (cents p. 32 lb.): | | | | | | | | | |
| delivery December | 39 ³ / ₄ | 37 ⁷ / ₈ | 39 ¹ / ₂ | 38 ³ / ₄ | 37 ³ / ₄ * | 39 ³ / ₄ * | 27 ³ / ₄ * | 31 ¹ / ₂ * | 49 ¹ / ₂ |
| " May | 35 ¹ / ₂ | 34 ¹ / ₂ | 36 ³ / ₄ | 36 ³ / ₄ | 36 | 38 ¹ / ₄ | 28 ³ / ₄ | 30 ¹ / ₂ | 49 ¹ / ₂ |
| " July | 31 ³ / ₄ | 31 ¹ / ₂ | 33 | 32 ¹ / ₂ | 32 ³ / ₄ | 34 | 27 ³ / ₄ * | 29 ¹ / ₂ | 44 ³ / ₄ |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery November | — | — | — | 3.75 * | 3.70 | — ¹⁾ | 5.02 | — | — |
| Maize. | | | | | | | | | |
| Chicago (cents p. 56 lb.): | | | | | | | | | |
| delivery December | 60 | 59 ¹ / ₂ | 63 ³ / ₄ | 63 ¹ / ₄ | 62 ¹ / ₄ * | 54 ¹ / ₄ * | 49 ¹ / ₄ * | 56 ³ / ₄ | 108 ¹ / ₂ |
| " May | 59 ⁷ / ₈ | 59 ³ / ₄ | 61 ⁷ / ₈ | 63 ¹ / ₄ | 62 ³ / ₄ | 56 ³ / ₄ | 52 ¹ / ₄ | 59 ³ / ₄ | 104 ¹ / ₂ |
| " July | 59 ³ / ₄ | 59 ³ / ₄ | 61 ³ / ₄ | 63 ³ / ₄ | 62 ³ / ₄ | 56 ¹ / ₄ | 53 ¹ / ₄ | 59 ³ / ₄ | 101 |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery November | — | — | — | 3.30 | 3.17 | — | — | — | — |
| " December | n. q. | n. q. | 3.00 | 3.35 | 3.24 | 7.00 * | 7.28 * | 8.42 | — |
| " February | n. q. | n. q. | 3.12 | 3.44 | 3.36 | 7.33 | 7.72 | 8.67 * | 5.94 |
| Linseed. | | | | | | | | | |
| Buenos Aires (paper pesos p. 100 kg.): | | | | | | | | | |
| delivery November | — | — | — | 9.25 | 9.11 | — | — | — | — |
| " February | 9.48 | 9.40 | 9.43 | 9.45 | n. q. | 16.55 | 13.73 | 15.07 * | 13.85 |
| Duluth (cents p. 56 lb.): | | | | | | | | | |
| delivery December | ... | ... | ... | ... | ... | 189 | 182 ¹ / ₄ * | 196 ¹ / ₂ | 213 ⁷ / ₈ |
| " May | ... | ... | ... | ... | ... | 199 ¹ / ₄ | 187 | 198 ³ / ₄ | 213 |

* Indicates that the product was not quoted during part of the period under review. — n. q. = not quoted.
 (1) December futures.

INDEX-NUMBERS OF PRICES OF AGRICULTURAL PRODUCTS AND OF COMMODITIES BOUGHT BY THE FARMER

| DESCRIPTION | Oct. | Sept. | August | July | June | May | Oct. | Oct. | YEAR | |
|---|---------------------|-------|--------|-------|-------|-------|--------------------------|--------------------------|-----------------------------|-----------------------------|
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 (¹) | 1938 (²) | 1939-40 (³) | 1938-39 (⁴) |
| Germany | | | | | | | | | | |
| (Statistisches Reichsamt; products sold by farmers) | | | | | | | | | | |
| Average for corresponding months 1909-10/1913-14 = 100. | | | | | | | | | | |
| Cereals | 110 | 108 | 110 | 101 | 110 | 109 | 109 | 109 | 111 | 111 |
| Edible potatoes | 108 | 119 | 147 | 147 | 115 | 120 | 108 | 108 | 115 | 116 |
| Plant products | 109 | 110 | 119 | 120 | 111 | 112 | 109 | 109 | 112 | 112 |
| Meat animals | 95 | 96 | 97 | 100 | 102 | 102 | 95 | 93 | 98 | 97 |
| Livestock products (butter and eggs) | 117 | 122 | 127 | 137 | 142 | 137 | 105 | 104 | 118 | 111 |
| Livestock and livestock products | 101 | 103 | 105 | 112 | 115 | 113 | 98 | 96 | 104 | 101 |
| Total agricultural products | ⁵ 104 | 105 | 109 | 113 | 115 | 113 | 102 | 100 | 106 | 104 |
| Germany | | | | | | | | | | |
| (Statistisches Reichsamt; wholesale products) 1913 = 100. | | | | | | | | | | |
| Agricultural products | ⁶ 110.2 | 110.9 | 112.0 | 112.3 | 112.3 | 111.7 | 107.5 | 105.7 | 107.9 | 105.9 |
| Fertilizers | 53.2 | 53.1 | 51.1 | 50.1 | 49.6 | 54.2 | 52.9 | 54.5 | 54.6 | 55.3 |
| Consumption goods (⁷) | 144.9 | 144.4 | 144.0 | 142.9 | 141.8 | 139.3 | 136.3 | 135.1 | 135.9 | 135.4 |
| Wholesale products in general | ⁸ 110.6 | 110.5 | 110.8 | 110.7 | 110.4 | 109.9 | 107.1 | 105.7 | 106.9 | 105.7 |
| Argentina | | | | | | | | | | |
| (Banco Central de la República Argentina) 1926 = 100. | | | | | | | | | | |
| Cereals and linseed | 49.6 | 59.1 | 63.1 | 72.9 | 69.9 | 73.4 | 80.3 | 73.2 | 77.6 | 90.6 |
| Meat | 97.9 | 99.5 | 107.3 | 107.5 | 107.2 | 108.1 | 102.2 | 88.3 | 94.5 | 94.8 |
| Hides and skins | 87.4 | 74.9 | 64.9 | 68.4 | 77.3 | 90.3 | 106.8 | 93.2 | 89.2 | 81.9 |
| Wool | 98.6 | 95.7 | 95.0 | 93.1 | 108.7 | 129.4 | 135.1 | 87.6 | 103.9 | 92.5 |
| Dairy products | 85.1 | 89.1 | 89.7 | 89.3 | 88.3 | 81.5 | 92.2 | 73.6 | 83.0 | 83.9 |
| Forest products | 115.6 | 111.6 | 111.6 | 111.6 | 111.2 | 110.7 | 109.5 | 100.6 | 104.2 | 100.0 |
| Total agricultural products | ⁹ 65.1 | 70.3 | 73.0 | 79.6 | 79.5 | 84.6 | 90.4 | 78.8 | 83.6 | 90.6 |
| Non-agricultural commodities | 137.0 | 136.6 | 136.3 | 136.5 | 135.9 | 134.7 | 126.2 | 108.0 | 114.8 | 109.4 |
| Wholesale products in general | ¹⁰ 121.6 | 122.4 | 122.7 | 124.4 | 123.8 | 124.1 | 118.7 | 101.8 | 108.2 | 105.5 |
| Chili | | | | | | | | | | |
| (Dirección General de Estadística) 1913 = 100 | | | | | | | | | | |
| Cereals | ... | ... | 486.6 | ... | 478.0 | 476.2 | 433.0 | 590.4 | 441.1 | 551.0 |
| Other plant products | ... | ... | 505.7 | ... | 513.1 | 494.6 | 410.0 | 381.9 | 396.9 | 375.4 |
| Meat animals | ... | ... | 450.1 | ... | 395.1 | 383.0 | 398.1 | 419.3 | 366.1 | 380.3 |
| Meat | ... | ... | 410.1 | ... | 373.3 | 358.6 | 280.6 | 376.7 | 303.4 | 324.7 |
| Total agricultural products | ... | ... | 485.1 | ... | 477.2 | 464.7 | 403.1 | 448.4 | 400.7 | 424.3 |
| Domestic industrial products | ... | ... | 489.2 | ... | 484.0 | 475.8 | 424.6 | 479.4 | 433.6 | 472.5 |
| Wholesale products in general | ... | ... | 562.5 | ... | 557.1 | 550.7 | 489.9 | 519.4 | 496.7 | 510.7 |

(¹) Household goods of all kinds, and clothing. — (²) For Chili the comparison is made with the data for August 1939 and August 1938. — (³) Agricultural year: July 1-June 30. — (⁴) November: 105. — (⁵) November: 110.6. — (⁶) November: 110.8. — (⁷) November 66.8. — (⁸) November: 122.1.

| DESCRIPTION | Oct. | Sept. | August | July | June | May | Oct. | Oct. | YEAR | |
|---|---------------------|-------|--------|-------|-------|-------|------|-------|------|-------|
| | 1940 | 1940 | 1940 | 1940 | 1940 | 1940 | 1939 | 1938 | 1939 | 1938 |
| United States | | | | | | | | | | |
| (Bureau of Agricultural Economics) | | | | | | | | | | |
| Average 1909-10 to 1913 14 = 100. | | | | | | | | | | |
| A: UNCORRECTED | | | | | | | | | | |
| FOR SEASONAL VARIATION | | | | | | | | | | |
| Cereals | 80 | 77 | 76 | 78 | 83 | 92 | 77 | 60 | 72 | 74 |
| Cotton and cottonseed | 78 | 76 | 77 | 80 | 81 | 83 | 74 | 72 | 73 | 70 |
| Fruits | 79 | 73 | 79 | 89 | 104 | 88 | 73 | 70 | 77 | 73 |
| Meat animals | 112 | 114 | 110 | 110 | 102 | 108 | 112 | 111 | 110 | 114 |
| Dairy products | 116 | 111 | 109 | 105 | 104 | 106 | 112 | 107 | 104 | 109 |
| Chickens and eggs | 112 | 104 | 90 | 88 | 81 | 84 | 108 | 124 | 94 | 108 |
| Miscellaneous | 100 | 95 | 107 | 98 | 100 | 101 | 94 | 107 | 93 | 98 |
| Total agricultural products | ^{a)} 99 | 97 | 96 | 95 | 95 | 98 | 97 | 95 | 92 | 95 |
| Commodities bought for use in living and production | 122 | 122 | 122 | 122 | 123 | 123 | 122 | 121 | 121 | 122 |
| Prices, interest and taxes paid by farmers | 127 | 127 | 127 | 127 | 128 | 128 | 128 | 127 | 127 | 127 |
| Agricultural wages ⁽¹⁾ | 129 | — | — | 129 | — | — | 126 | 126 | 122 | 124 |
| B: CORRECTED | | | | | | | | | | |
| FOR SEASONAL VARIATION | | | | | | | | | | |
| Cereals | 82 | 78 | 76 | 77 | 79 | 90 | 80 | 62 | — | — |
| Cotton and cottonseed | 79 | 74 | 74 | 77 | 79 | 81 | 75 | 73 | — | — |
| Fruits | 83 | 78 | 80 | 81 | 87 | 77 | 75 | 76 | — | — |
| Truck crops (market garden crops) | 99 | 118 | 112 | 98 | 134 | 133 | 128 | 107 | — | — |
| Meat animals | 113 | 114 | 108 | 107 | 101 | 106 | 113 | 111 | — | — |
| Dairy products | 115 | 113 | 114 | 110 | 108 | 109 | 111 | 106 | — | — |
| Chickens and eggs | 100 | 103 | 99 | 103 | 96 | 100 | 96 | 110 | — | — |
| Miscellaneous | 98 | 96 | 100 | 93 | 96 | 98 | 94 | 103 | — | — |
| Total agricultural products | ^{a)} 98 | 97 | 96 | 95 | 95 | 98 | 96 | 94 | — | — |
| Agricultural wages ⁽¹⁾ | 125 | — | — | 125 | — | — | 122 | 122 | — | — |
| United States | | | | | | | | | | |
| (Bureau of Labor) | | | | | | | | | | |
| 1926 = 100. | | | | | | | | | | |
| Grains | 65.4 | 61.7 | 59.3 | 60.8 | 64.4 | 71.2 | 61.6 | 50.8 | 58.7 | 60.6 |
| Livestock and poultry | 70.6 | 72.4 | 71.5 | 69.8 | 64.7 | 69.6 | 70.6 | 76.2 | 72.2 | 79.0 |
| Other farm products | 63.8 | 63.2 | 63.3 | 65.6 | 67.0 | 65.5 | 66.1 | 65.0 | 62.6 | 63.9 |
| Total agricultural products | ^{a)} 66.4 | 66.2 | 65.6 | 66.5 | 66.2 | 67.9 | 67.1 | 66.8 | 65.4 | 68.5 |
| Agricultural implements | 92.5 | 92.4 | 92.3 | 92.4 | 92.5 | 92.5 | 93.4 | 95.4 | 93.4 | 95.5 |
| Fertilizer materials | 68.1 | 68.1 | 68.0 | 67.3 | 67.4 | 70.8 | 70.6 | 67.5 | 70.0 | 69.2 |
| Mixed fertilizers | 74.2 | 74.2 | 74.2 | 72.8 | 72.8 | 73.0 | 72.6 | 73.4 | 73.0 | 72.2 |
| Cattle feed | 80.1 | 75.9 | 74.5 | 83.2 | 80.0 | 93.3 | 82.9 | 66.5 | 82.0 | 76.9 |
| Non-agricultural commodities | 81.3 | 80.4 | 79.9 | 80.0 | 79.8 | 80.5 | 82.0 | 79.9 | 79.6 | 80.6 |
| Wholesale products in general | ^{a)} 78.7 | 78.0 | 77.4 | 77.7 | 77.5 | 78.4 | 79.4 | 77.6 | 77.2 | 78.6 |
| Hungary | | | | | | | | | | |
| (Central Royal Bureau of Statistics) | | | | | | | | | | |
| 1929 = 100. | | | | | | | | | | |
| Cereals | 102.3 | 101.3 | 100.3 | 98.9 | 91.7 | 91.7 | 85.1 | 87.9 | 85.9 | 89.1 |
| Total raw plant products ⁽²⁾ | 112.8 | 114.4 | 108.8 | 106.3 | 96.4 | 93.2 | 80.0 | 78.6 | 79.5 | 76.9 |
| Meat animals, meat and lard | 99.1 | 92.4 | 94.2 | 88.4 | 86.2 | 86.7 | 67.9 | 71.9 | 65.1 | 68.4 |
| Total livestock products ⁽³⁾ | 98.6 | 87.3 | 88.4 | 84.3 | 83.1 | 83.9 | 66.8 | 68.1 | 65.6 | 65.6 |
| Total agricultural products | ^{a)} 108.3 | 105.9 | 102.4 | 99.4 | 92.2 | 90.3 | 75.9 | 75.3 | 75.2 | 73.4 |
| Products of agricultural industries | 106.6 | 104.6 | 104.2 | 99.0 | 99.0 | 98.9 | 93.8 | 100.1 | 93.9 | 103.0 |
| Industrial raw materials and products | 105.5 | 105.1 | 104.5 | 103.9 | 103.1 | 102.2 | 94.5 | 92.9 | 93.1 | 93.3 |
| Wholesale products in general | ^{a)} 107.0 | 105.7 | 104.0 | 101.9 | 98.7 | 97.5 | 87.5 | 87.0 | 86.3 | 86.8 |

⁽¹⁾ 1910-1914 = 100. — ⁽²⁾ Including unspecified products. — ⁽³⁾ November: 99. — ⁽⁴⁾ November: 98. — ⁽⁵⁾ November: 68.2. — ⁽⁶⁾ November: 79.6. — ⁽⁷⁾ November: 108.6. — ⁽⁸⁾ November: 107.5.

| DESCRIPTION | Oct. 1940 | Sept. 1940 | August 1940 | July 1940 | June 1940 | May 1940 | Oct. 1939 (¹) | Oct. 1938 (¹) | YEAR | |
|--|--------------|---------------|----------------|--------------|--------------|-------------|----------------------------------|----------------------------------|-----------------------------|-----------------------------|
| | | | | | | | | | 1939 | 1938 |
| Ireland | | | | | | | | | | |
| (Department of Industry and Commerce) | | | | | | | | | | |
| Average 1911-1913 = 100. | | | | | | | | | | |
| Agricultural products in general. . . | ... | ... | 146.1 | 143.3 | 143.8 | 150.8 | 133.2 | 116.1 | 120.7 | 111.9 |
| Norway | | | | | | | | | | |
| (Kgl. Selskap for Norges Vel) | | | | | | | | | | |
| Average 1909-1914 = 100. | | | | | | | | | | |
| | | | | | | | | | 1939-40 (¹) | 1938-39 (¹) |
| Cereals | 213 | 185 | 175 | 175 | 175 | 175 | 170 | 167 | 168 | 168 |
| Potatoes | 208 | 223 | 214 | 454 | 369 | 399 | 217 | 121 | 186 | 174 |
| Pork | 163 | 163 | 163 | 163 | 163 | 170 | 154 | 135 | 141 | 127 |
| Other meat | 215 | 215 | 214 | 203 | 196 | 211 | 168 | 167 | 168 | 179 |
| Dairy products | 218 | 198 | 198 | 198 | 198 | 198 | 188 | 175 | 186 | 176 |
| Eggs | 162 | 162 | 162 | 147 | 147 | 147 | 157 | 162 | 129 | 124 |
| Concentrated feedingstuffs | 218 | 218 | 203 | 203 | 199 | 199 | 159 | 161 | 163 | 158 |
| Maize | 205 | 205 | — | — | 188 | 188 | 168 | 156 | 165 | 158 |
| Fertilizers | 148 | 138 | 124 | 124 | 124 | 124 | 90 | 100 | 101 | 98 |
| Netherlands | | | | | | | | | | |
| (Bureau of Agriculture) | | | | | | | | | | |
| Average 1924-25 to 1928-29 = 100. | | | | | | | | | | |
| Plant products | ... | ... | 75 | 73 | 73 | 74 | 64 | 58 | 69 | 62 |
| Livestock products | ... | ... | 78 | 79 | 77 | 77 | 62 | 63 | 71 | 64 |
| Total agricultural products | ... | ... | 78 | 78 | 76 | 76 | 62 | 62 | 70 | 63 |
| Wholesale products in general (¹) | ... | ... | ... | ... | ... | ... | 70.5 | 70.8 (¹) | 73.7 (¹) | 71.9 |
| Agricultural wages | ... | ... | 86 | 86 | 86 | 86 | 75 | 74 | 77 | 74 |
| Switzerland | | | | | | | | | | |
| (Schweizerischer Bauernverband) | | | | | | | | | | |
| 1914 = 100. | | | | | | | | | | |
| | | | | | | | | | 1939 | 1938 |
| Slaughter cattle | 135 | 135 | 132 | 128 | 128 | 127 | 120 | 115 | 115 | 117 |
| Slaughter pigs | 174 | 165 | 152 | 141 | 141 | 144 | 144 | 126 | 129 | 125 |
| Milk (base price) | 135 | 135 | 135 | 135 | 135 | 135 | 121 | 121 | 122 | 120 |
| Total agricultural products | 149 | 144 | 141 | 139 | 138 | 138 | 128 | 119 | 126 | 126 |
| Feedingstuffs (²) | 163 | 159 | 148 | 142 | 137 | 132 | 121 | 106 | 113 | 105 |
| Fertilizers (²) | 124 | 121 | 114 | 112 | 112 | 107 | 109 | 99 | 101 | 96 |
| Wholesale products in general (³) | 155.5 | 152.0 | 145.7 | 140.6 | 138.7 | 134.9 | 120.1 | 105.8 | 111.2 | 107.1 |
| Yugoslavia | | | | | | | | | | |
| (National Bank of the Kingdom of Yugoslavia) | | | | | | | | | | |
| 1926 = 100. | | | | | | | | | | |
| Plant products | 176.5 | 173.8 | 163.6 | 128.7 | 118.3 | 107.7 | 76.8 | 84.4 | 82.5 | 85.8 |
| Livestock products | 113.4 | 105.1 | 93.1 | 87.4 | 85.8 | 89.7 | 71.10 | 65.8 | 68.7 | 65.8 |
| Industrial products | 121.1 | 120.9 | 114.8 | 106.1 | 106.4 | 103.8 | 82.9 | 75.9 | 79.8 | 78.2 |
| Wholesale products in general | 132.1 | 129.4 | 121.2 | 108.3 | 105.8 | 102.8 | 80.1 | 76.8 | 79.3 | 78.3 |

(¹) Index numbers calculated by the Centraal Bureau voor de Statistiek, base 1926-1930. — (²) Index numbers calculated by the Bundesamt für Industrie, Gewerbe und Arbeit; base July 1914. — (³) For the Netherlands the comparison is made with the data for August 1939 and August 1938. — (⁴) Agricultural year April 1 to March 31 for Norway and July 1 to June 30 for the Netherlands. — (⁵) Calendar year. — (⁶) November: 137. — (⁷) November: 161.1.

APPENDIX**THE CENSUS OF AGRICULTURAL HOLDINGS IN LATVIA IN 1939.**

In the April 1940 issue of our Bulletin we published some results of the agricultural census taken in Latvia from June 26 to July 9, 1939.

Further details on the number of agricultural holdings, divided according to their total area, mode of tenure and ownership of the land have since appeared in a volume (I) published by the Latvian Bureau of Statistics. The following Table is obtained therefrom:

Distribution of Agricultural Holdings in Latvia.

| HOLDINGS | Under 1 hectare | From 1 to 2 hectares | From 2 to 5 hectares | From 5 to 10 hectares | From 10 to 15 hectares | From 15 to 20 hectares | From 20 to 30 hectares | From 30 to 50 hectares | From 50 to 100 hectares | Above 100 hectares | General total | Total above 1 hectare |
|--------------------------|--------------------|-------------------------|-------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|-----------------------|------------------|--------------------------|
| Farmed by owners: | | | | | | | | | | | | |
| (a) | 30,464 | 7,155 | 17,055 | 37,551 | 36,307 | 34,831 | 32,787 | 20,587 | 12,410 | 901 | 230,048 | 199,584 |
| (b) | 23 | 11 | 18 | 18 | 10 | 7 | 15 | 21 | 26 | 31 | 180 | 157 |
| (c) | 272 | 163 | 184 | 79 | 28 | 18 | 26 | 19 | 26 | 21 | 836 | 564 |
| Total | 30,759 | 7,329 | 17,257 | 37,648 | 36,345 | 34,856 | 32,828 | 20,627 | 12,462 | 953 | 231,064 | 200,305 |
| Leased: | | | | | | | | | | | | |
| (a) | 3,647 | 1,334 | 2,073 | 1,964 | 2,094 | 2,502 | 3,160 | 3,016 | 1,643 | 111 | 21,544 | 17,897 |
| (b) | 193 | 68 | 122 | 151 | 90 | 58 | 66 | 33 | 22 | 13 | 816 | 623 |
| (c) | 1,997 | 488 | 572 | 401 | 210 | 138 | 162 | 165 | 95 | 12 | 4,240 | 2,243 |
| Total | 5,837 | 1,890 | 2,767 | 2,516 | 2,394 | 2,698 | 3,388 | 3,214 | 1,760 | 136 | 26,600 | 20,763 |
| In partnership | — | 7 | 38 | 174 | 345 | 543 | 862 | 1,040 | 478 | 18 | 3,505 | 3,505 |
| (a) | — | — | 1 | 14 | 22 | 21 | 5 | 2 | — | — | 65 | 65 |
| (b) | — | — | 1 | 7 | 6 | 2 | 14 | 29 | 7 | — | 66 | 66 |
| (c) | — | — | — | — | — | — | — | — | — | — | — | — |
| Total | — | 7 | 40 | 195 | 373 | 566 | 881 | 1,071 | 485 | 18 | 3,636 | 3,636 |
| Other (1): | | | | | | | | | | | | |
| (a) | 35 | 12 | 10 | 5 | — | — | — | — | — | — | 62 | 27 |
| (b) | 2,168 | 569 | 382 | 1,638 | 539 | 175 | 66 | 18 | 1 | — | 5,556 | 3,388 |
| (c) | 1,009 | 733 | 975 | 571 | 203 | 65 | 63 | 42 | 24 | 1 | 3,686 | 2,677 |
| Total | 3,212 | 1,314 | 1,367 | 2,214 | 742 | 240 | 129 | 60 | 25 | 1 | 9,304 | 6,092 |
| Total: | | | | | | | | | | | | |
| (a) | 34,146 | 8,508 | 19,176 | 39,694 | 38,746 | 37,876 | 36,809 | 24,643 | 14,531 | 1,030 | 255,159 | 221,013 |
| (b) | 2,384 | 648 | 523 | 1,821 | 661 | 261 | 152 | 74 | 49 | 44 | 6,617 | 4,233 |
| (c) | 3,278 | 1,384 | 1,732 | 1,058 | 447 | 223 | 265 | 255 | 152 | 34 | 8,828 | 5,550 |
| GENERAL TOTAL | 39,808 | 10,540 | 21,431 | 42,573 | 39,854 | 38,360 | 37,226 | 24,972 | 14,732 | 1,108 | 270,604 | 230,796 |

(1) Holdings the use of which is granted to country employees of State and Communal Administrations.

(a) On land privately owned. — (b) On land of the State. — (c) On land of the Communes or public bodies.

(1) Bureau de la Statistique de la Lettonie: Recensement agricole de 1939. I. Recensement. Nombre des exploitations agricoles. Riga, 1940.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

AGRICULTURAL SCIENCE AND PRACTICE

MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

AGRICULTURAL LIBRARIES

AN INTERNATIONAL SURVEY

During 1934-35, the International Institute of Agriculture by means of an extensive inquiry endeavoured to obtain data on the agricultural libraries of the different countries of the world. The material received was so abundant that in addition to the publication of the 'International Directory of Agricultural Libraries' in 1939, a more detailed study appeared necessary. The replies to the inquiry were analyzed statistically as far as possible, whereas the problems of the inner organization of the libraries were dealt with by investigating a selected group of particularly important agricultural libraries. Conclusions and suggestions for a more useful and rational organization of agricultural library service are given.

Importance of agricultural libraries.

Among the various institutions for agricultural education and research, libraries undoubtedly play a rôle almost as important as that of experiment stations, laboratories and similar organizations. A characteristic of agricultural research and its development is the autonomy and independence which educational and research institutions have long enjoyed, being generally unconnected with other organizations. These circumstances also had a pronounced effect on the status of agricultural libraries and – earlier than in other sciences – a strong tendency towards the formation of autonomous libraries specializing in agriculture was noted. In general, these specialized libraries naturally form an essential part of agricultural colleges, independent institutions or research and experiment stations, government agencies and agricultural corporations and associations. Until recently it was almost impossible to ascertain the number and distribution of agricultural libraries, because in the usual guides to libraries and in the lists of scientific institutions, these specialized libraries, which are attached to some other institution, are generally omitted.

The inquiry of the International Institute of Agriculture.

It seemed, therefore, desirable in the interest of agricultural research to prepare an inventory of the agricultural libraries of the different countries. The library of the International Institute of Agriculture in collaboration with

the International Committee of Agricultural Librarians organized an international inquiry with a view to ascertaining present conditions in the various countries. The results of this inquiry were published in the «International Directory of Agricultural Libraries» issued in 1939⁽¹⁾. The information obtained through the questionnaire, however, was so interesting and abundant that it seemed worth while to supplement the list by a comparative study on the status, distribution and organization of the agricultural libraries in the various countries.

Since this inquiry was the first undertaking of its kind, a complete list could not be expected. In some countries the inventory of agricultural libraries has been handicapped by political events. It was not always possible to keep in contact with the newest developments and in many instances data which were not up-to-date had to be used. It was particularly regrettable that a country of such agricultural importance as the U. S. S. R. had to be excluded entirely because of the very inadequate number of replies received. An especially difficult problem was that of making a good selection of the libraries to be included in the list, especially in regard to the size of the collection, and to what extent connected sciences should be considered. Another difficulty was presented by agricultural collections forming part of large general libraries which in size and importance are in many cases superior to the smaller specifically agricultural libraries. There is no doubt that the large national libraries offer a rich source of agricultural literature, but it was not within the scope of the inquiry to list these collections which as a rule cannot be determined numerically. An exception has been made in the case of the libraries of such educational institutions of general character where agricultural research and teaching are especially important.

With regard to the specifically agricultural libraries which comprise all branches of agriculture, it seemed advisable to establish a size limit in order to avoid including an excessive number of small school or society libraries. This limit was fixed at 2000 volumes, but libraries specializing in some specific branch of agricultural science although not attaining this number, have been included. Among the libraries dealing with allied subjects, particular attention has been given to those specializing in silviculture and veterinary science, and in some cases to those reserved for natural sciences.

These particular circumstances and difficulties have to be kept in mind when reading this study, especially in regard to the statistical data. It should also be noted that the greater part of the data refers to 1934 and 1935 and that undoubtedly many changes have since taken place not only in size of the collections but also in number and organization of the libraries.

(1) *Les bibliothèques agricoles dans le monde. International directory of agricultural libraries.* Rome, 1939. 311 pp. 25 Lire (Text in French and English). Preparation of the questionnaires and the compilation of the list were carried out by Mme MARA CAMERANI-TEODOROVA.

Some statistical data on agricultural libraries.

Although the questionnaire which was drafted in 6 languages had been sent to about 3000 addresses, only 944 replies could be utilized in view of the criteria mentioned above. The distribution of the libraries in the various countries is shown in the following table.

Total number of libraries included in the directory.

(Countries comprising more than 10 libraries).

| | | | |
|--|-----|--|-----|
| United States | 128 | Spain (Situation at the end of 1936) | 22 |
| Germany (Territory at the end of 1939) | 110 | Australia | 19 |
| Great Britain and colonies | 99 | Norway | 18 |
| France and colonies | 71 | Netherlands and colonies | 18 |
| Italy and colonies | 62 | China | 14 |
| Japan | 38 | Estonia | 12 |
| India | 36 | Bulgaria | 12 |
| Former Czechoslovakia (Territory at the end of 1939) | 36 | Belgium | 12 |
| Hungary | 29 | Sweden | 10 |
| Switzerland | 27 | Rumania | 10 |
| Canada | 25 | Union of South Africa | 10 |
| Poland (before the outbreak of hostilities) | 23 | Other countries | 117 |
| | | TOTAL | 944 |

It is seen from this table that the United States holds the leading position with 128 agricultural libraries. Next follows a group of countries possessing over 60 agricultural libraries each. This group includes Germany, France, Great Britain and Italy. Another group includes Japan, India, former Czechoslovakia, Hungary, Switzerland, and Canada. In these countries the number of agricultural libraries varies from 25 and 40. It is interesting to observe that no relation can be established between the number of agricultural libraries and the size or the density of the population of the different countries. In fact, several of the smaller countries have a comparatively excellent system of agricultural libraries.

If forestry and veterinary libraries are excluded and only purely agricultural libraries taken into consideration, the figures are somewhat different. In this way, about 26 per cent. of the libraries are deducted and about 700 libraries remain which are distributed among the various countries as follows*.

Taking into consideration, general libraries with important agricultural collections (chiefly the libraries of colleges and universities) the United States again lead with 39 libraries, Great Britain and colonies follow with 14, India with 12, France and China with 11 libraries each. The predominance of English speaking countries is evidently due to the characteristic organization of agricultural instruction, which in these countries is given mostly in the universities and only to a small extent in autonomous agricultural colleges.

* See table on p. 258.

Total number of specifically agricultural libraries.

(Excluding general libraries and forestry and veterinary science libraries).

| | | | |
|---|----|------------------------------------|-----|
| Germany | 88 | Canada | 14 |
| United States | 73 | Norway | 14 |
| Great Britain and colonies | 72 | Netherlands and colonies | 12 |
| Italy and colonies | 59 | Bulgaria | 12 |
| France and colonies | 53 | Estonia | 10 |
| Japan | 30 | Brazil | 8 |
| Former Czechoslovakia (end of 1939) | 29 | Belgium | 8 |
| Hungary | 25 | Rumania | 8 |
| Switzerland | 21 | Egypt | 8 |
| India | 20 | Other countries | 82 |
| Australia | 18 | | |
| Spain | 17 | | |
| Poland | 15 | | |
| | | TOTAL | 696 |

In regard to forestry libraries, the United States again lead with 16 specialized libraries. Germany follows closely with 12 libraries, while Canada, Great Britain, Japan, the Netherlands, Norway and former Czechoslovakia only count 3 or 4 forestry libraries each. The greatest number of veterinary science libraries, however, is to be found in Great Britain (together with the colonies); these are 10 and considerably more than in any other country.

Specialized agricultural libraries.

It is not without interest to observe how the libraries which specialize in certain branches of agricultural science (264 in all) are divided among the different countries and according to subject. These libraries are particularly numerous in the following countries: Germany (36), Italy (30), Great Britain (22), Hungary (17), France (16), United States (14), Japan (13), Switzerland (12), former Czechoslovakia (11).

If the number of these specialized libraries is compared with that of general agricultural libraries the position is somewhat different. Italy, Hungary, Switzerland, Poland and a few other smaller countries, are characterized by their relatively large number of specialized agricultural libraries.

If these libraries are subdivided according to the branch of agriculture in which they are specialized it is seen that some subjects are more favoured than others. The most numerous are horticultural libraries (43), followed by those specializing in plant protection and entomology (21), agricultural technology and chemistry (21), plant breeding and seeds (20), animal husbandry (18), agricultural economics (15), dairying (12), soil science and land development (11), viticulture and wine-making (10). The following table shows the specialized agricultural libraries divided according to broad subjects.

Specialized agricultural libraries.

| | Number | % |
|--|--------|-----|
| General agronomy | 55 | 21 |
| Special field crops | 29 | 11 |
| Horticulture, fruits and viticulture | 63 | 24 |
| Animal husbandry, including apiculture and sericulture | 36 | 14 |
| Agricultural industry and chemistry | 44 | 16 |
| Agricultural economics | 19 | 7 |
| Miscellaneous | 18 | 7 |
| | 264 | 100 |

Date of foundation.

The foundation date of the various libraries was also requested in the questionnaire. The replies received however were not sufficient to permit a statistical analysis for the various countries. Apparently the majority of agricultural libraries were founded between 1850 and 1900. In many countries however, for example Germany, Italy, Great Britain, Japan, Australia and the United States, a comparatively large number of agricultural libraries were established after the World War of 1914-18.

Date of foundation prior to 1850 was reported by 55 libraries. The early history of autonomous agricultural libraries is closely connected with the general advance of agricultural research and instruction which began in most European countries in the middle of the 18th century. The oldest library is that of the 'Accademia dei Georgofili' of Florence which originated in 1753. In France the library of the « Académie d'Agriculture » goes back to 1761, and in the same year the libraries of several local academies and economic associations at the instigation of the government were also founded. The oldest agricultural library of Germany is the library of the Royal Hanoverian Agricultural Society, founded between 1765 and 1770, which later on became the property of Albrecht Thaer, afterwards transformed into the library of the Chamber of Agriculture and finally the 'Landesbauernschaft Hannover'. In Great Britain the 'Library of the Highlands and Agricultural Society of Scotland' was founded in 1783, while the oldest college library dealing with agricultural and veterinary science was established in the same year at Copenhagen.

* * *

The information obtained through the questionnaire on the organization of the different libraries was so varied and at the same time so incomplete that a detailed statistical study was out of the question. It was deemed advisable, therefore, to select a certain number of especially important libraries which furnished detailed information on their organization.

Size of book collection.

It is very difficult to compare data on the total number of books and periodicals of the various libraries as international standards for library statistics have not yet been put into practice. According to the results of the inquiry on selected libraries the largest institution would be the Library of the Italian Ministry of Agriculture and Forests. It must be taken into account, however, that this is a special case. The Ministry of Agriculture, established in 1929, took over the large collection of the former Ministry of National Economy, and can only be regarded as an agricultural library in view of its recent collections. Apart from this library, the largest library is that of the International Institute of Agriculture, closely followed by the library of the Department of Agriculture of the United States. In fact, if special collections (horticultural trade catalogues, pamphlets, reprints and Government documents) are included, the Department library with a total of 395,207 vols. (1939) is larger than that of the Institute which for the same year counted 339,236 volumes. Other important libraries which number between 200,000 and 300,000 volumes are the libraries of the Iowa State College of Agriculture in Ames and the Landbouwhoogschool in Wageningen (Netherlands). Another category can be established for libraries with a total ranging from 100,000 to 200,000 volumes, which would include the library of the Reichsernährungsministerium in Berlin, that of the agricultural Faculty of the University of Berlin, the libraries of the Veterinary and Agricultural College in Copenhagen and the Agricultural Academy at Prague.

Periodicals.

The largest collection of current periodicals is found in the Library of the Department of Agriculture in Washington (4,500 periodicals and 175 newspapers). The collection of the International Institute of Agriculture at present comprises 3,571 current periodicals. Other libraries containing a collection of over 1,000 periodicals are the libraries of the Agricultural College in Ames (Iowa), the main library of the Department of Agriculture in Ottawa, the libraries in Prague, Wageningen, Copenhagen and that of the Ministry of Agriculture in London. In many cases, however, the data on the number of periodicals received are evidently based on rough estimates and should not be taken as definite.

It is rather difficult from the data of library totals, to establish a standard figure for the size of central agricultural libraries. The size of a library depends on different factors and in particular, period of establishment, available financial resources, extension of the national literature of the country, and the more or less intensive importance given to the basic and auxiliary sciences of agriculture. In general, however, an agricultural library of importance, even in a small country, to meet the requirements of the country, should contain about 250,000 volumes and 2,500 current periodicals.

Catalogues.

For efficient utilization of library collections, catalogues are indispensable. Among the various types of catalogues the printed catalogue in volume form is rarely found in agricultural libraries. The reasons for this fact are evident and apply equally to all libraries. Printed catalogues are expensive and are soon out of date unless supplemented by current accession lists, supplements etc. Mention should be made of the printed catalogues of the library in Wageningen and of the library attached to the Italian Ministry of Agriculture, which is very complete, even for non-agricultural subjects, but unfortunately, not brought up-to-date. An example of an excellent catalogue of a specialized library is that of the Massachusetts Horticultural Society, a volume of about 600 pages, well printed and carefully prepared, giving complete bibliographical indications on the important collection of this library.

Printed catalogues of periodicals, however, are more general because they can be used with advantage as bibliographical reference lists even outside of the library. Excellent catalogues of periodicals and serials have been published by the library of the Department of Agriculture in Washington. The catalogues of the College of Agriculture in Kyoto (Japan), the Department of Agriculture in Sydney, and the library of the Faculty of the University of Bonn (Poppelsdorf) should also be mentioned. The library of the International Institute of Agriculture is at present preparing a comprehensive catalogue of its collection of periodicals, which will certainly fill an important gap in agricultural literature, because it will be of use not only in the library itself but also as a bibliographical reference book of international importance.

Manuscript catalogues (in volume form) are only found in a few of the early established libraries. In most libraries, they have been replaced by card catalogues of international size (12.5 × 7.5 cm). In arrangement of card files, two systems are followed. The majority of large European libraries use the alphabetical author catalogues together with the classified subject catalogue, occasionally supplemented by an alphabetical subject catalogue. The « Dictionary Catalogue » introduced by the Americans into library technique, which combines in one list, in alphabetical order, names of authors, subject headings and titles, is used very extensively in the United States and to a smaller extent in other countries outside Europe, and in particular, English-speaking countries. The use of the geographical catalogue is rather limited; this system is for instance adopted in the library of the International Institute of Agriculture and in the library of the Department of Agriculture at Sydney. In many large libraries the main catalogue is supplemented by different lists on certain special subjects. Among these special card files which comprise various types, mention may be made of the « depositary catalogues », composed of the excellently printed cards of the Library of Congress in Washington, and which—as far as is known—are sent to two important agricultural libraries outside the United States, namely to the Institute's Library in Rome and to the library of the Department of Agriculture in Ottawa. The file of the Library of Congress cards established

at the Institute's library in Rome in the form of a dictionary catalogue totals 225,000 cards and forms a valuable supplement to the main catalogue of the library.

Classification systems.

In libraries dealing with a special subject such as agriculture the classification of the books is very important. The libraries, therefore, were asked to indicate the classification system used. Sixty-six libraries reported the use of the Decimal Classification. Although this number is encouraging, as indicating a tendency towards the general adoption of a uniform classification scheme, its value is partly lost as unfortunately the Decimal Classification in itself is anything but uniform. There is for example the original American 'Decimal Classification' which owes its origin to Melvil Dewey, the French edition of the 'Classification Décimale', of the former 'Institut International de Bibliographie' in Brussels, which differs considerably from the American system especially in regard to agriculture, and other modifications of the Decimal Classification such as the Japanese system, called 'Nippon D. C.', and the modified Dewey system used at the Department library in Sydney. It should also be noted that most of the larger agricultural libraries employ independent systems (e. g. Berlin, Copenhagen, Prague, Rome, Wageningen, Washington). It must be admitted however, that there is a tendency towards the general use of the 'Classification Décimale' in the revised form in Great Britain. The majority of the Imperial Bureaux for the different branches of agricultural science have adopted this system for their catalogues and their excellent bibliographies.

In the library of the International Institute of Agriculture, the Decimal Classification in its early Brussels edition (1907), has been used since the foundation of the Institute for the main catalogue. In view of the somewhat unsatisfactory results obtained *, however and in particular, the bibliographical activity † of the Institute, an independent classification scheme § was established in 1934. This classification has been adopted for establishing a comprehensive bibliographical repertory and, despite its recentness, has already been introduced into agricultural libraries in different countries.

Staff. Loans.

Only very general conclusions can be drawn from the data available on the staff of the different agricultural libraries of importance as the professional training and the functions of the different members of the staff were not indicated

* S. V. FRAUENDORFER. Classification problems in an international specialized library (*Library Quarterly*, v. 4, No. 2, pp. 223-233, April 1934).

† In particular the quarterly '*International bibliography of agricultural economics*' (from October 1938 onwards).

§ *Système de classification des sciences agricoles. Classification scheme of agricultural sciences. Stoffeinteilung der Landwirtschaft*. Rome, 1924. XXV, 171 pp. (Text in 3 languages).

in the questionnaires returned. The American libraries on account of their very up-to-date library methods require a relatively numerous staff. Mention should be made in particular of the library of the Department of Agriculture in Washington which employs a staff of 38 in the central library and 86 in the various branches. This figure is much higher than that of European libraries of which only a few employ a staff over 10. Among the largest is the library of the International Institute of Agriculture, followed by the library of the Ministry of Agriculture in Rome and the libraries of Wageningen and Prague.

It is even more difficult to use the data on circulation of books and readers for direct comparison. The loan service depends on the scope of the library, and it is evident that the libraries of colleges or universities are frequented to a greater extent than those attached to research institutions or government offices. The majority of large agricultural libraries are affiliated to the International Loan Service.

Conclusions.

Reviewing the results of the inquiry as a whole, it is seen that there are many excellently organized agricultural libraries and that in several countries, particularly in the United States, a close collaboration exists between agricultural libraries. This position, however, is not the rule, and in general, agricultural library work still leaves much to be desired. In making suggestions for improvement in the organization of agricultural libraries, the activity of large general libraries in the field of agriculture should also be taken into consideration. General libraries cannot undertake to meet requirements of agricultural research workers to the same extent as specialized libraries, being fully occupied in other directions. The importance of specialized agricultural libraries, therefore is evident.

It appears desirable, therefore, that each country should possess at least one large agricultural library for the purpose of collecting and assembling all national agricultural publications and the more important scientific publications of other countries. This central library would also work in collaboration with similar institutions in other countries and at the same time compile and publish a national agricultural bibliography.

The question whether this head library should be attached to the agricultural governing board, to the most important agricultural college, or to the principal farmers' association, or established as an independent organization depends on the conditions prevalent in each country. In any case, the central agricultural library service would have to be supplemented by other smaller libraries placed at the chief centres in the country or attached to the various agricultural colleges. These libraries should maintain a close and permanent contact with each other and with the head library in order to facilitate inter-library loan service and bibliographical collaboration. These smaller libraries should specialize in some branch of agriculture in accordance with the trend followed at the institution to which they are attached, or with the agricultural conditions of the region in

which they are situated. Collaboration with libraries dealing with allied sciences, such as forestry, veterinary medicine, natural sciences etc., should be established.

It goes without saying that all research institutions dealing with some special branch of agriculture should be equipped with a complete and up-to-date library.

Finally, in order to meet the requirements of the farmers, each country should organize a system as complete as possible of small local agricultural libraries. These small libraries could eventually be attached to general public libraries, to secondary agricultural schools or to the farmers' associations of the district.

Since an international agricultural library, one of the largest in the world, has been in existence at the International Institute of Agriculture for about the last thirty years, the ground is well prepared for close international collaboration in agricultural library service, the more so as international contacts between agricultural librarians have been established since 1935. These led to the establishment of an international committee which has already given proof of its efficacy in promoting international collaboration in the field of agricultural documentation.

S. V. FRAUENDORFER

THE FORAGE PROBLEM IN THE UNION OF SOUTH AFRICA

*(Continued) **

V. — Establishment of artificial pastures.

In recent years, increasing interest has been given to the establishment of artificial pastures, and has led to considerable controversy on the question. By means of artificial pastures, it is desired not only to supply stock with more and better forage but also to have available food reserves necessary when veld grazing is inadequate. In laying out suitable pastures, several factors have to be taken into consideration, and in particular: choice and preparation of land, choice and selection of forage species or varieties, method of exploitation, and pasture renewal.

Experiments have been carried out at several centres of the Union of South Africa, chiefly at Pretoria, Prinshof and Cedara. In the following pages, the results obtained are briefly reviewed and conclusions are drawn.

* See B. May and June 1940.

(a) CHOICE AND PREPARATION OF LAND.

There is a close relation between soil fertility and the forage plants which the soil will carry. Good quality forage cannot be grown on poor soils without the addition of fertilizers, and if this elementary fact is not taken into account in establishing new pastures, results are bound to be disappointing. Preference, therefore, should be given to soils of good average or even better quality, free from weeds, taking into consideration that the greater the fertility of the soil, the lower the water requirements of the plants to obtain the same production in dry matter, the greater the resistance to frost and the quicker the renewal in growth.

Soil preparation is very important as is evident when it is considered that the forage plants will cover the land for several years during which the soil cannot be tilled and that the economic success of the undertaking depends on the duration of the period of its utilization.

(b) CHOICE AND SELECTION OF FORAGE SPECIES OR VARIETIES.

Generally speaking, the species of forage plants which send out suckers and shoots are to be preferred to those which grow in clumps, as the former cover the land better and more quickly, produce fodder of a better quality, conserve more moisture and are more efficacious in preventing soil erosion.

Owing to the wide differences existing between the types of soil and climate prevailing in the Union of South Africa, it is absolutely impossible to select one or more species producing equally satisfactory results throughout the whole country.

It is therefore necessary to experiment in each district, determining the species, varieties or breeds which are best suited to the conditions prevailing in a given area and which also offer the desired characteristics. These characteristics may be defined as follows: (1) a prolonged season; (2) rapid covering of the soil; (3) high yield and production capacity of the forage plant; (4) resistance to heat, cold, frost and disease; (5) high nutritive value not only during the first stages of growth but also at the time of ripening and during the period of vegetative rest; (6) abundant seed production; (7) palatability; (8) absence of toxicity; (9) resistance to trampling by the stock. Moreover, if good hay is to be produced the forage plants must give a high yield of green cover, and mowing must be easy and frequent while avoiding injury to the growth. A study of the principal species and varieties has shown that certain types exist offering some of the above characteristics, but that there are none which present the whole series. For some years now selectors have been trying to create hybrid types combining the largest number of characteristics in a single type. As will be seen below, they have already been successful in creating some interesting new strains.

Consideration must be given, however, to a new problem of a more general order: should attention be devoted to the cultivation of winter forage

crops in preference to summer forage plants? Stockbreeders are extremely anxious to accumulate sufficient supplies of green fodder for the winter, although most farms lack soil suitable for this purpose. They are consequently obliged to be sparing in their use of winter forage if they wish to obtain the maximum yield from the small area available during the months of winter drought; but when only winter forage is grown, the farmers are tempted to allow the stock to graze over these crops during the summer and the winter yield is therefore considerably reduced. Winter forage, on the contrary, should only be used for obtaining hay during the summer. In order to ensure enough fodder for the stock during the summer, it is therefore necessary to cultivate summer forage with a higher nutritive value than the forage plants which grow wild on the veld. Moreover, winter forage must not be considered as the only source of feeding stuff for the stock during the winter and grazing should be restricted to a few hours, enough to supply the animals with the necessary hydrates, since the basis of the diet consists of dry summer hay, ensilage and grain.

A general survey carried out under the direction of the Head of the Division of Plant Industries has made it possible to determine the most important species of forage plants. These species belong to the genera *Digitaria*, *Chloris*, *Pennisetum*, *Panicum*, *Urochloa*, *Echinochloa*, *Themeda*, *Paspalum* and *Sorghum*. Results obtained at the Prinshof and Pretoria Experiment Stations during the past few years have led to the determination of the strains of forage plants supplying good quality hay which are best suited to the various regions and to the climatic conditions prevailing in the Union. It has been observed in the course of these experiments that very few grasses have given satisfactory results owing to the unfavourable climatic and soil conditions, these plants requiring conditions which are only to be found in regions of restricted area. In particular, they do not appear to be able to resist the dry winters with their extremes of temperature, although they can resist fairly intense cold as long as there is sufficient moisture in the soil; in short, the establishment of good pasturage with imported species presents little prospect of success except in certain favoured areas, such as some of the districts to the east of the Drakensberg and in some of the coastal zones further north. Some gramineous forage plants imported from abroad, such as cock's foot grass, meadow soft grass, fescue grass, *Agrostis vulgaris* and above all *Paspalum dilatatum*, are, however, exceptions, and can be grown with success, the first four as winter forage in the eastern district of the highveld and the last as summer forage. Mention should also be made here of tefi (*Eragrostis abyssinica*) which was introduced in 1903 and which will be discussed below in connection with forage plants used as hay.

Research workers have devoted particular attention to the study of native gramineae. So far experiments have been made with several varieties and strains of *Digitaria*, some of which have proved very satisfactory, especially *Digitaria abyssinica* (Dunn's finger grass) in the very rainy areas, the Port Elizabeth strain in the coastal regions, and the Shelley Bay and Pongola River strains in the sandy districts. With the exception of *Digitaria smutsii*, most of the species which do not send out suckers are of little use as they are fibrous and do not afford good soil cover.

The *Panicum* grasses form another fairly important group of useful forage plants, the principal species suitable for cultivation being: *Panicum maximum*, *P. coloratum*, *P. minus*, *P. phragmatoides* and *P. muticum*.

The two genera mentioned above have formed the subject of very exhaustive study as they contain both the most useful and the most common varieties. Research workers have also studied some of the less common varieties which offer satisfactory results in given areas. In this connection mention may be made, for instance, of *Chloris gayana*, *Setaria* sp., *Echinochloa* sp., *Themeda* sp. and especially of *Pennisetum clandestinum* (Kikuyu). On the basis of results obtained from cultivation and botanical research, the following list of forage plants suitable for the establishment of artificial grazing lands has been compiled:

(a) on the sandy soil of the Kalahari region, where the annual rainfall varies from 10 to 15 in.: *Digitaria setaria* (various types);

(b) on the heavier soil in the Kalahari region (river beds and hill slopes), grey soils with a rainfall varying between 10 and 15 in.: *Cenchrus ciliaris*, various strains of *Digitaria*, *Panicum maximum* and *P. coloratum*;

(c) on calcareous soils with a rainfall between 10 and 15 in.: various strains of *Digitaria* and *Panicum coloratum*;

(d) on granitic soil where the rainfall varies between 15 and 25 in.: various strains of *Digitaria*, *Panicum coloratum* and *Urochloa*;

(e) on compact and schistic red soil where the rainfall varies between 15 and 25 in.: *Digitaria pentzii*, *D. valida* and various strains of *Digitaria*; *Panicum coloratum*, *P. maximum*, *Setaria* sp., *Chloris gayana* and *Urochloa* sp.;

(f) on black soil where the rainfall varies from 15 to 25 in.: *Digitaria vanita*, var. *glauca* and various strains of *Digitaria* sp., various strains of *Panicum coloratum* and *P. maximum*, various strains of *Echinochloa* and *Conchrus ciliaris*; *Setaria* sp. and *Chloris gayana*.

The list applies principally to the Transvaal and certain districts of the Orange Free State and Cape Province; the species and strains mentioned grow equally well, however, in all the areas offering the characteristics described. A. PENTZ, of the Pretoria Botanical Station, recommends the following species and varieties: *Digitaria eriantha*, var. *stolonifera*, *Panicum maximum*, *Pennisetum ciliare*, *P. unisetum*, *P. purpureum*, *Setaria lindbergiana*, *Echinochloa pyramidalis*, *Brachiaria brisantha*, *Chloris gayana*, *Ischaemum mellei* and *I. glaucostachyum*.

All farm animals find *Digitaria eriantha* var. *stolonifera* palatable; it offers a rational winter diet if supplemented with spineless cactus, an acre of this forage plant per head of stock being sufficient. *Panicum maximum* is fairly resistant to drought but is affected by frost; *Pennisetum ciliare*, although one of the forage plants which offers most resistance to drought, is seriously affected by frost; moreover, although it produces good hay, the animals do not find it palatable in the green state. *Pennisetum unisetum* resists both drought and frost, produces good hay and may also be used in the green state. *Pennisetum purpureum* produces large quantities of green substance suitable for ensilage. *Setaria lindbergiana* ripens earlier than any other forage plant in the dry

regions; it is naturally resistant to drought but is affected by frost. It produces excellent hay which is found palatable by cattle. *Echinochloa pyramidalis* produces abundant hay and may also be fed to stock in the green state. *Brachiaria* is an excellent forage but does not stand up to either drought or frost. *Chloria gayana* is one of the best forage plants grown in the Union of South Africa; it produces excellent hay and may be used in the green state as the animals find it very palatable. *Ischaemum mellei* produces hay of excellent quality when grown in damp regions; *Ischaemum glaucostachyum*, on the contrary, is drought resistant and produces hay of a very superior quality.

A. MARAIS considers that the cultivation of winter forage should be restricted to the regions with the highest rainfall. He also thinks that in these regions and in the more fertile soils preference should be given to ray-grass, cock's foot grass and *Phalaris tuberosa*. Generally speaking, summer forage plants grow better than winter forage plants in the high-lying areas; since the soil is only of average fertility in most of these regions, by far the best results are obtained with *Paspalum dilatatum*. MARAIS advises the use of Kikuyu (*Pennisetum clandestinum*) in the more fertile areas. Kikuyu is a forage plant of very high quality and, when cultivated under suitable conditions, produces twice the crop obtained from the *Paspalum* varieties. The various strains of finger grass (*Digitaria eryantha*) are also excellent forage plants; MARAIS makes special mention of Swaziland finger grass which in his opinion produces the best forage grown in the Union of South Africa for feeding sheep.

R. LINDSAY ROBB has made an exhaustive study of the results of all research work carried out in the Union of South Africa concerning the selection of forage plants and he also considers Kikuyu as one of the most productive species in South Africa, when sown in fertile soil in areas with an adequate rainfall. This species is perhaps the most difficult to grow, however, and requires heavy manuring. FISCHER has obtained extraordinarily high milk yields per hectare at Cedara on Kikuyu. In the course of experiments at Umbogetierui, MEREDITH observed that abundantly manured Kikuyu pastures can produce as much as 13,300 kg. of dry fodder and 1730 kg. of raw protein per hectare; no such figures have been obtained elsewhere. MEREDITH considers that owing to its high forage capacity, its uniform annual production and its comparatively high content of essential minerals, Kikuyu may be regarded as superior to Rhodes grass (*Chloris gayana*), and, when grown in sandy soil in the coastal regions to *Paspalum dilatatum*. In heavy land, however, *Paspalum* produces better forage than Kikuyu and since it does not require such a high degree of fertility as the latter, can be more extensively grown. Among the many varieties of *Paspalum*, *P. dilatatum* is the most widely cultivated, but *Paspalum virgatum* and *notatum* are also worth mentioning; the latter especially affords dense cover and is suited to very hot areas.

The *Digitaria* varieties were formerly very popular as winter forage, probably because when ripe they have a higher protein content than the other species of native forage plants; experiments have proved, however, that as winter forage the *Digitaria* provide only a partial maintenance diet; as summer forage they supply a full production diet. It is probable, moreover, that Rhodes grass could

be used advantageously in rotation for the supply of hay required to supplement the forage obtained from early and late pasturage; if used in this way, it could to a certain extent replace teff (*Eragrostis abyssinica*).

(c) SUPPLEMENTARY FORAGE PLANTS.

It has already been seen that throughout the greater part of the Union of South Africa, forage plants have a very low protein content during the winter months. In establishing artificial meadows, research workers, Du Toit in particular, have taken account of this fact and have attempted to use only those species which are richer in protein than the veld species. The choice of these species depends, of course, to a greater extent on environmental conditions. Du Toit is of the opinion that winter forage plants, such as the *Bromus unioloides*, ray-grasses, cock's foot grass and certain cereals, e. g., oats, barley and rye, as well as fodder cabbage and fodder beets, may be cultivated with the help of irrigation or even without irrigation in the areas with the highest rainfall. Most of these plants have a high protein content when young and may be cultivated successfully for grazing during the winter months in almost every area of the Union; they also have a high moisture and vitamin content. Rye and oats are best suited to the highveld and grow well in dry ground if the soil is fertile enough and has stored sufficient moisture before the end of the summer rains. On the other hand, we do not know whether the supplementary protein content obtained from artificial summer meadows which are killed by winter frosts, justifies the additional expense involved in propagation and the care of these forage plants and in the work entailed in weed control. The struggle against weeds is, in fact, the source of a considerable outlay in many regions and is a serious obstacle to the successful cultivation of these artificial forage crops. Du Toit considers that in any case it will be necessary to supplement the diet with foods rich in protein.

From the above it will be seen that the choice of gramineous forage plants for the establishment of artificial meadows is very complicated. Research work carried out at the various experiment stations has proved that, since environmental conditions are subject to wide variations, it is impossible to select a species suitable for cultivation throughout the whole territory of the Union. Research workers are also unanimous in advising against the use of imported gramineae (with a few exceptions) and in suggesting the use of native species, especially Kikuyu, the various species of *Paspalum*, *Digitaria eryantha*, Rhodes grass and *Themeda triandra*. Finally, the fact that grasses are very poor in protein has led research workers to contemplate the use of supplementary forage plants: leguminous forage crops or forage plants which have a high protein content such as fodder cabbage, fodder turnips and beets, watermelons and certain cereals.

(d) CULTIVATION OF LEGUMINOUS FORAGE PLANTS.

Legumes are especially rich in protein and, as has already been said, their use as supplementary fodder has been suggested. They may be grown in regions where there is a winter rainfall; in the western and northern areas, the

cowpea is undoubtedly one of the best forage legumes. The soybean, on the contrary, is grown most successfully in damp, misty regions and on the highveld where there is a risk of serious rust attacks. Various other species can be used such as the velvet bean, *Dolichos*, vetches, clovers, groundnuts and especially alfalfa.

Experiments made by SMITH at the Bathurst Station in connection with the cultivation of forage vetches have given good results. He has experimented with three varieties; purple, hairy and spring, each of which is suited to some particular use. The first gives a maximum yield but is not very palatable; on the contrary, animals find the taste of the second very pleasant; it also gives good results when grown in conjunction with cereals such as barley and oats; lastly, the third variety is the best of the three and is suitable for consumption either in the green state or in the form of hay. It is interesting to observe that vetch stalks do not become so ligneous as those of alfalfa and their content of indigestible fibre is consequently lower.

The question of the advisability of introducing clovers has often been raised. Clovers, in fact, do not establish themselves spontaneously and the plants send out fragile shoots which, unless irrigated, are incapable of producing green forage comparable to that obtained from rapidly growing gramineae. It is easier to maintain a high protein content in forage plants by applying manure and by arranging a careful method of grazing than by producing a scanty clover crop. The use of clover should be restricted to cases where winter irrigation is possible or in areas with a winter rainfall. The best types of clover for cultivation under these circumstances are subterranean clover, ladino and hubam clover. They should be sown in autumn for spring grazing, the first mentioned being particularly suitable as a diet for sheep.

The cultivation of alfalfa should be limited chiefly to dry, irrigable areas; the area sown to this crop may be increased in relation to irrigation possibilities. Alfalfa may also be grown with a fair amount of success without irrigation in any region which is neither too damp nor too hot, if soil conditions are favourable or can be improved by fertilization or manuring with lime. This crop grows especially well without irrigation in many districts of the Highveld if sown in rows so as to facilitate weeding, the number of plants being regulated in relation to the rainfall.

Since alfalfa grows very quickly, from 5 to 8 cuts may be obtained yearly, but this involves a large supply of water. The number of varieties of alfalfa grown in South Africa is very restricted, the commonest being *South African Provence*; other varieties used are *Hunters' River* and *Chencese*; *Arabian* and *Hairy Peruvian* are also grown but on a very small scale. The Grootfontein School of Agriculture has carried out some very successful research work in connection with this crop which does not present any very special characteristics. We will consequently not give any technical details on the subject, but will only emphasize the difficulties encountered in South Africa in weed control; as the alfalfa grows older the weeds spread more easily and the farmer is often compelled to mow down entire fields of the plant in order to get rid of the weeds.

This crop is generally used in the form of hay; the age at which the plant is mown has an important influence on the quality and quantity of hay obtained. The following tables show the hay yield obtained at various stages of growth and the effect of the time of cutting on the chemical composition of the alfalfa stalks, leaves and flowers.

TABLE II. — *Hay yield in lb. per morgen (0.85652 ha.) at various flowering stages.*

(According to W. TURPIN and D. W. MCKELLAR)

| Variety | Bud stage | 10 % bloom | 50 % bloom | 100 % bloom |
|--------------------------|-----------|------------|------------|-------------|
| Provence | 29,378 | 35,158 | 35,028 | 35,154 |
| Hunters' River | 32,502 | 37,392 | 30,882 | 36,442 |

TABLE III. — *Chemical composition of alfalfa stalks, leaves and flowers at various times of cutting (Provence variety).*

(According to W. TURPIN and MCKELLAR)

| Stage | Analysis of | % Ash | % Fats | % Crude protein | % Crude fibre | % Nitrogen free extract | % Moisture in air dry sample |
|----------------|-------------|-------|--------|-----------------|---------------|-------------------------|------------------------------|
| Bud stage . . | Stalks . . | 9.80 | 1.08 | 16.66 | 38.01 | 34.28 | 6.10 |
| | Leaves . . | 11.26 | 2.91 | 31.94 | 13.93 | 40.00 | 5.73 |
| 10 % bloom . . | Stalks . . | 8.21 | 1.29 | 12.03 | 44.87 | 33.59 | 6.01 |
| | Leaves . . | 11.79 | 3.94 | 28.46 | 14.22 | 41.69 | 5.97 |
| | Flowers . . | 7.42 | 2.02 | 26.73 | 17.55 | 46.11 | 8.40 |
| 50 % bloom . . | Stalks . . | 7.23 | 1.09 | 9.73 | 49.85 | 32.10 | 6.14 |
| | Leaves . . | 11.19 | 4.05 | 28.09 | 14.44 | 42.42 | 6.71 |
| | Flowers . . | 7.70 | 2.04 | 24.40 | 15.52 | 50.21 | 8.36 |
| 100 % bloom . | Stalks . . | 7.29 | 0.98 | 10.27 | 53.37 | 28.09 | 5.59 |
| | Leaves . . | 11.03 | 4.04 | 26.44 | 15.38 | 43.10 | 6.75 |
| | Flowers . . | 7.64 | 1.98 | 24.3 | 18.16 | 47.92 | 8.73 |

The figures in the above tables show the results obtained under ideal conditions when no loss occurs. Under normal conditions there may be a loss of 20 per cent. or more of leaves when the hay is put into the mill and this lowers the quality considerably. The total yield varies but little if the crop is cut after 10 per cent. of the flowers are in bloom, but the quality shows a definite falling off. Taking all these facts into consideration, it appears desirable to cut

alfalfa when flowering commences, namely, when about 10 per cent. of the flowers are in bloom. Some farmers in the Union still cut their alfalfa even earlier or at the end of flowering. This does not seem to be advisable as it is certain, and, in fact, experience has shown, that if mowing takes place constantly before the plants have bloomed, the result is not only a loss in yield but also a reduction in the density of green cover and an invasion of weeds throughout the field.

Stockbreeders are also turning their attention towards the utilization of alfalfa in the green state. The first use of alfalfa as green forage was probably made by ostrich breeders, but this plant is now in common use as grazing for all farm animals. This use of alfalfa depends in large measure on certain conditions such as the need for green fodder and the advantages accruing to the use of the small winter crop which cannot be converted into hay. Alfalfa grazing is practised in spite of the considerable risk of meteorism among ruminants.

As a rule, stockbreeders are of opinion that grazing, if excessive, has a bad effect on the alfalfa fields and that it may lead to a considerable reduction in the life of the plants. Experiments were made at Grootfontein to determine the actual effects of grazing on this crop. They have proved that it is not advisable to use alfalfa fields for grazing during the spring months and that, in cases where it is absolutely necessary to use the plant for this purpose, the farmer must at least wait until the plants are in flower. When alfalfa is used for grazing in the green state, an attempt must be made to alternate the grazing periods with others when the crop is used for hay, always beginning with a hay crop. Lastly, grazing should be avoided when there is any danger of soil subsidence resulting from the trampling of the stock. The Grootfontein experiments have also proved that grazing over the young shoots whose growth has been stimulated by winter irrigations, encourages the growth of weeds and ends by causing the destruction of the crop. In order to prevent excessive trampling of the soil and the destruction of the green cover due to a prolonged period of grazing, it is advisable to divide the alfalfa field into a suitable number of camps to be grazed over quickly in succession.

Alfalfa, like all summer perennial forage plants, has the disadvantage of having its maximum fodder capacity during the period of growth, while its nutritive value is much reduced if not absolutely lacking during the winter. This explains why an attempt has been made to maintain this fodder capacity throughout the year either by cultivating supplementary meadows such as winter cereals, or by adopting a system by which the alfalfa field is used alternately for grazing and cutting, the hay from this fast operation being used to complete the winter diet when the forage capacity of the alfalfa field is low.

During the past few years an attempt has been made to use these fields for rearing lambs. The results have varied from year to year, but have led to the conclusion that sheep which graze constantly on alfalfa do not suffer from digestive troubles. The best method is to make successive use of alfalfa fields and the veld, or else alfalfa fields alternated with another forage such as a winter cereal or Sudan grass.

It seems that owing to its high nutritive value, green alfalfa could give interesting results when used for feeding milch cows. During repeated experiments carried out at Grootfontein, milch cows were allowed to graze on alfalfa fields at intervals of between 3 and 7 days, the intervals being arranged to avoid the danger of meteorism. It was noted that the milk yield declined as soon as the cows had eaten the tops of the plants; it was found necessary from that moment to complete the ration with concentrated feeding stuffs if the level of the milch yield was to be maintained. In order to avoid this disadvantage, it was decided to divide the alfalfa fields into a sufficient number of plots so that the milch cows remain in each plot just long enough to eat the tops of the plants. The remainder of the plants can then be fed to horses, calves, etc. Lastly, in order to prevent the coloration of the milk, cows fed on alfalfa are taken from the meadow about three hours before milking. From these experiments it may therefore be concluded that green alfalfa may be freely used for feeding milch cows without in any way injuring the yield or the quality of the milk.

No complete solution has as yet been found for the problem of meteorism resulting from the consumption of alfalfa, whether in the fresh state or as ensilage. Opinions differ considerably, but the use of alfalfa has proved very risky in certain cases. It has been established that wilted, frosted or damp alfalfa is very dangerous; young, succulent alfalfa is also liable to produce hoven. It is also believed that dry winds which wilt the plants make them particularly dangerous. Stockbreeders use different methods for lessening the risk: day and night grazing, gradual lengthening of the grazing period, permanent supplies of water and dry feed on the meadows. The Grootfontein School is always ready to advise farmers on the best way to prevent bloat-ing.

This brief summary has shown that the introduction of legumes as supplementary green feed offers wide prospects for the future. If the necessary precautions are taken, alfalfa, in particular, has proved to be very well suited to this purpose.

(to be continued)

J. LEGROS.

ADOPTION OF NEW TECHNICAL METHODS IN WALL CONSTRUCTION FOR RURAL BUILDINGS

Recent attempts to adopt new methods for the construction of rural buildings were described in No. 1 of this Bulletin ⁽¹⁾ and it was concluded that increasing importance attaches to the use of light material for surface building, while compact materials, such as concrete, are best suited to basement or underground walls.

(1) See Bulletin No. 1, January, 1940, pp. 26-80. *New tendencies in rural buildings.*

The construction of underground masonry, especially gravel concrete moulded in wooden frames, requires much skilled labour, however, and this is not always available in the country, particularly in the case of small buildings. This fact has given rise in Germany to the idea of manufacturing series of hollow concrete blocks in advance; these concrete blocks may be used as a framework and set up easily and quickly in the buildings even by unskilled workers. Fig. 1 shows a few of these blocks manufactured in gravel concrete; they measure from 30 to 38 cm. in width, the walls being 3 cm. or less in thickness. The blocks may be assembled without mortar, the hollow spaces being subsequently filled with layers of concrete.

Apart from their use in the construction of underground walls, these blocks may also be used in erecting the surface walls of dwellings and stables; in this case, however, they should be filled with some light material, such as porous concrete or *pisé*, instead of gravel concrete. It is even probable that these framework blocks will lead to a revival of the use of adobe in a new form for rural buildings, since this material, with its thermal and insulating properties, is suitable for the construction of cheap and healthy dwellings and stables.

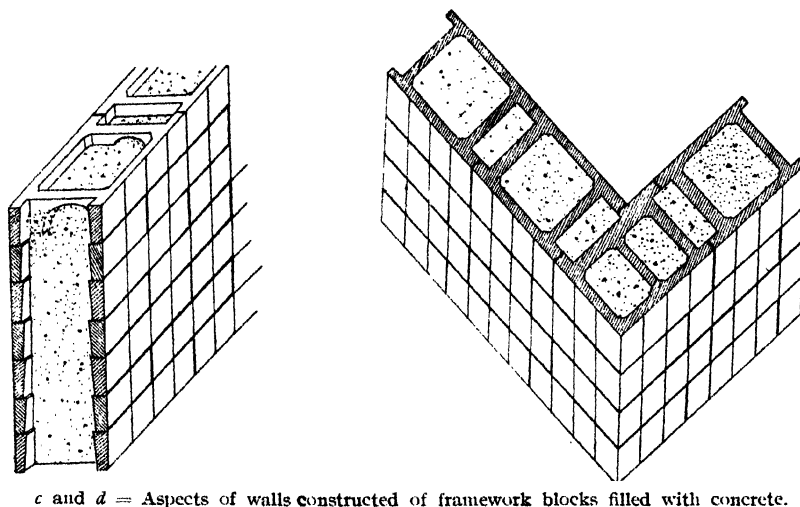
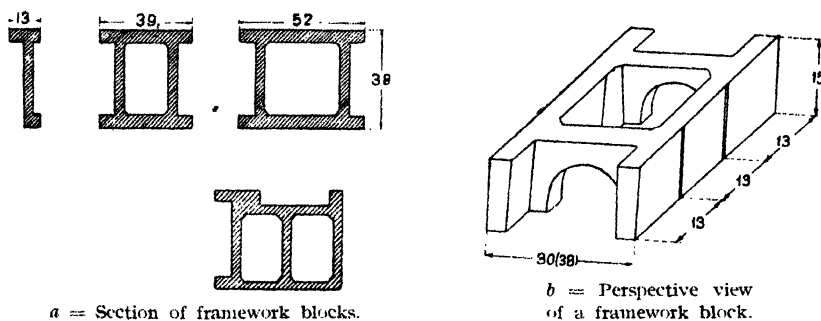
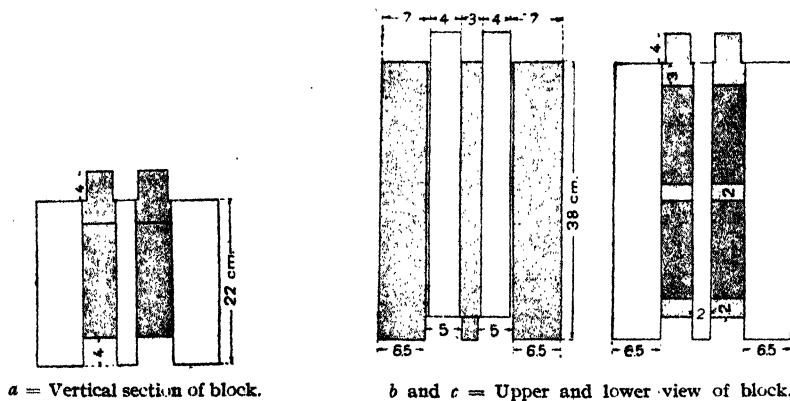
Too much stress cannot be laid on the importance, from the point of view of the health of both man and beast, of building dry outer walls with thermo-insulating properties. Even today, unfortunately, stable walls are all too often damp instead of dry, thus encouraging the development and spread of various diseases. If the stables are to be dry it is not sufficient to arrange for good ventilation; great care must also be devoted to the choice of suitable building materials.

In the previous article referred to above, it was shown that compact masonry in heavy stone is the least suited of all materials for the construction of outer walls above ground, because walls of this description absorb moisture and are very sensitive to cold and heat. This is why light and porous materials have been used increasingly in recent times; porous bricks and blocks of light concrete in particular give excellent results. Each of these two materials has individual advantages but up to the present they have always been used separately. It was not until recently that builders started using large blocks manufactured of waste from porous bricks and concrete. Since this type of block has an adequate resistance and excellent thermo-insulating properties, it has been thought that use might be made of a basic material consisting not only of brick waste, but also of porous bricks specially manufactured in the form of small blocks thus combining the excellent properties of brick with those of concrete and obtaining an exceptional type of building material. It remains to be seen, however, whether the increased expense resulting from the manufacture of these bricks is compensated by the excellent quality of the material.

The important point to be considered is not only the quality of the building materials, but also their shape as this has a great influence on the thermal insulation of the masonry and on the amount of mortar used; the latter is an excellent conductor of heat and damp, especially in the joints which penetrate the walls from one side to another. This consideration has led to the use in recent times of very large blocks requiring fewer mortar joints and an attempt

FIG. 1. — *Concrete framework blocks (D. R. P. a)*

(According to BAUWELT, Berlin 1940, Nr. 9., S. 130).

FIG. 2. — *Hollow block of brick concrete.*

is also being made to avoid as much as possible the use of joints which pass through the entire thickness of the wall. It is strange to observe, however, that either vertical or horizontal joints are avoided separately, but never the two types simultaneously.

This disadvantage is eliminated by the use of hollow blocks of brick concrete, as illustrated in Fig. 2. These blocks offer the following advantages:

- (1) Absence of joints passing through the entire thickness of the wall.
- (2) Low consumption of mortar, which, being applied only to the filled ends, dries up very quickly.
- (3) Good thermal-insulation, because the opposite hollows remain insulated (there is a double stratum of air) by a middle wall separating one from the other; this wall rests on a small quantity of dry sand and not on a layer of mortar.
- (4) Economy of material.

On principal, the shape of this type of block recalls the arrangement of 3 bricks set up vertically one beside the other, the two outside bricks bearing the weight while the inside brick, slightly displaced upwards and sideways acts as an insulator; in the case under consideration, it is represented merely by projections and a double stratum of air.

H. J. HOPFEN.

THE PROBLEM OF THE QUALITY OF BREAD

The nutritive value of bread varies in the different countries and from one place to another in the same country. It is important to understand the real nature of the cereal used to determine bread value. Bread must contain the valuable elements found in the grain and must preserve most of its gluten, diastases, mineral salts and vitamins.

Present conditions have led experts and consumers to take a daily increasing interest in the problem of the quality of raw materials used for human nutrition. In the case of bread this knowledge of quality becomes more and more imperative today if the requirements of all consumers are to be satisfied.

In the first place, it is important to know the real nature of the cereal consumed in order to determine the nutritive value of the bread produced. Wheat and rye have much the same nutritive value, since the average protein content of the whole grain of these two cereals and their various mineral elements are identical to a remarkable extent. Barley and oats are also very similar to wheat and rye as regards protein content and the proportion of their various mineral salts; the latter are much less abundant in maize, while rice is definitely much poorer in protein than the other cereals.

Although breadmaking has made little progress, the importance of bread in the human diet has led physiologists to make numerous studies which have altered some of the data which were formerly admitted as a matter of course. As a starting point we will reproduce here some of the conclusions of French scholars belonging to the 'Société Scientifique d'Hygiène Alimentaire', to the 'Académie de Médecine' and to the 'Commission d'Alimentation' de la Société de Biologie':

"(1) wheat must always be cleaned and freed from impurities and any foreign grain mixed therewith;

(2) industrially clean wheats vary considerably in weight and quality; average native wheat weighing between 76 and 77 kg. per hectolitre may be taken as a standard;

(3) milling produces breadstuff flour and bran, but the processes of milling do not allow of a perfect separation of the nutritive substances contained in the ear from its covering of indigestible matter; however high the percentage of extraction, some indigestible matter always passes into the flour, while a considerable proportion of nutritive substance remains among the bran;

(4) the nutritive value of brans decreases progressively in relation to the increase in the percentage of extraction;

(5) bran, which is the industrial waste from milling and has always an appreciable nutritive value for man, must not be confused with the husk which is an anatomical element of wheat and is practically never found in the pure state;

(6) the legal expression "wholemeal flour" does not correspond to any definite reality, since the proportion of the product which passes through a No. 100 sieve (100 meshes to the linear inch), may vary within very wide limits;

(7) extraction of 85 per cent. from average wheat is profitable and desirable when it is not necessary to ensure keeping the flour over a very long period; only 5 per cent. of this amount is indigestible and good bread may be made from this flour; the above percentage increases the quantity of flour available for human consumption without making any considerable reduction in its nutritive value; if a higher percentage is extracted the parts of the wheat which pass through the sieve produce flours whose nutritive value becomes increasingly lower, while it becomes more and more difficult to use them for breadmaking; the bran left over for animal diet after 85 per cent. extraction still contains a high proportion of nutritive matter suitable for the human diet;

(8) when it is desired to mill any other kind of wheat for the production of flours of a quality similar to that obtained from standard wheat, no alteration is required in mills adjusted to grinding the latter, even the cylinders and bolting-houses remaining the same;

(9) an admixture of substitute flours with wheat flour is acceptable on condition that the proportion of the former is not excessive and the resultant mixture is suitable for breadmaking".

The elements which constitute good bread must always be clearly defined, while its chemical composition, its digestibility and its degree of its assimilability

by the human organism must also be known. These data are a function of the work of breadmaking and especially of the fermentation of the dough and its baking.

Chemical composition of bread and its calorific value.

| | Water | Albumi- noids | Fats | Carbo- hydrates | Salts | Calories |
|---|-------|------------------|------|--------------------|-------|----------|
| White bread | 35.3 | 9.2 | 1.3 | 53.1 | 1.1 | 264 |
| Brown bread | 43.6 | 5.4 | 1.8 | 47.1 | 2.1 | 229 |
| Wholemeal bread (including bran) | 38.4 | 9.7 | 0.9 | 49.7 | 1.3 | 249 |
| Rye bread | 35.7 | 9.0 | 0.6 | 53.2 | 1.5 | 257 |

Mineral salts.

| | Anhydr. phosph. | Anhydr. sulph. | Oxide of K. | Oxide of Na. | Oxide of Ca. | Oxide of Mg. | Oxide of Fe. |
|-------------------------------|--------------------|-------------------|----------------|-----------------|-----------------|-----------------|-----------------|
| | % | % | % | % | % | % | % |
| White bread (made with wheat) | 52.63 | 0.68 | 32.32 | 3.16 | 3.64 | 5.67 | 0.83 |
| Rye bread | 49.33 | 1.12 | 30.04 | 3.22 | 2.08 | 9.84 | 2.17 |

Of all vegetal foods, wheat has the highest content of phosphorus. Several authors lay special stress on the fact that wheat contains 0.69 per cent. of phosphoric acid, representing more than half of the mineral content.

| Wheat | Gluten (70 % of flour) | % of Phosphorus | | | |
|----------------------------|------------------------------|-----------------|-------------|---|------------------|
| | | in bran | in husks | in the flour adhering to the bran | in 70 % flour |
| Foreign wheat: 1 | 15.43 | 0.764 | 0.887 | 0.196 | 0.178 |
| 2 | 15.00 | 0.713 | 0.837 | 0.249 | 0.162 |
| 3 | 14.23 | 0.808 | 0.950 | 0.258 | 0.148 |
| 4 | 13.68 | 0.775 | 0.853 | 0.240 | 0.162 |
| 5 | 12.94 | 0.769 | 0.832 | 0.218 | 0.181 |
| French wheat: 6 | 8.95 | 0.882 | 0.990 | 0.359 | 0.187 |
| 7 | 8.00 | 1.450 | 1.795 | 0.329 | 0.168 |
| 8 | 7.49 | 1.294 | 1.508 | 0.240 | 0.140 |
| 9 | 6.95 | 1.210 | 1.396 | 0.316 | 0.140 |

The above table shows that the phosphorus content increases steadily from the centre of the albumen towards the exterior of the ear constituted by the flour adhering to the bran, by the bran itself and by the husk. It will therefore be understood how the phosphorus content of flours also increases as the extraction percentage increases, since a larger quantity of those parts of the grain which are richest in phosphorus is incorporated in the flour.

A comparison of the average phosphorus content of 70, 75 and 80 per cent. flours and of bread is especially interesting. We have thus the following figures for the average phosphorus content of flours:

| | |
|------------------------------|-------|
| 70 per cent. flour | 0.163 |
| 75 " " | 0.178 |
| 80 " " | 0.184 |

These figures show that the amount of phosphorus gained is not so much as is usually stated, since the difference between 70 and 75 per cent. flour is only 15 mgm. per hundred and that between 70 and 80 per cent. flour, or, in other words, between white and very dark flour, is only 21 mgm. per hundred.

Moreover, consumption does not take place in the form of flour but in that of bread and consequently the basis of comparison should be the phosphorus content of the latter. Considering, on the one hand, that the proportion of moisture retained by bread increases in relation to gluten content and, on the other, that bread made with brown flour is always more hydrated than that made with white flour, the mixtures of wheat tested gave the following results:

| | |
|------------------------------|-------|
| 70 per cent. flour | 0.116 |
| 75 " " | 0.122 |
| 80 " " | 0.128 |

In other words, from 6 to 12 mgm. of phosphorus are gained on every 100 grams of bread in changing from 70 to 75 and 80 per cent. boltings.

As regards mineral salts—and iron in particular—there is a wider difference between wheat flours of different bolting than between wheat flour and rye flour with the same bolting.

DELBET and BERETEAU proved that the boltings at present in use leave the greater part of the magnesium content of the wheat ear in the bran, which is fed to animals, and the benefit of this mineral is lost to the human diet. The former also proved, and his thesis is supported by the results of other research work, that this relative shortage of magnesium affects the frequency of cancer. He also recalls that in 1934, Prof. PESSEY and his co-workers, H. LEESE and J. C. KNOX, of the Department of experimental pathology and cancer research at Leeds University, had confirmed his opinion that white bread is an injurious

factor leading to the cancerization of the organs. It is necessary that in making bread certain vital elements of the outer covering of the grain, such as vitamins and diastases, should be preserved.

VITAMINS.

As regards vitamins, the amount of vitamin B₁ contained in white breads made with sweet and sour doughs is much the same and is equivalent to about one third of the amount contained in wholemeal bread. White bread manufactured with artificial yeasts contained no visible traces of vitamin B₁. Wholemeal bread is slightly richer in vitamin B₂ and its constituents than white bread, but the difference is not so marked as in the case of vitamin B₁. In all cases of diet considered as a source of vitamin B₂, flavine is found to be the factor restricting growth. The different types of bread, considered only from the standpoint of dry weight, contain very much the same amount of both forms of vitamin B as the flours with which they are made, the only exception being bread made with artificial yeast, which contains even less of vitamin B₁ than the flour. The small quantities of yeast used are not sufficient to increase to any appreciable extent the vitamin content of bread over that of flour. No proof has so far been found of the synthesis or destruction of vitamin B₁ during the process of breadmaking with yeast. There has been much discussion of the importance of the content of vitamin B₁ in bread in relation to human requirements. Although relatively small in comparison with the amount contained in other foods, this content appeared to be high enough in white bread to supply a large part of the human requirement of this vitamin, especially when account is taken of the amount of bread consumed in relation to other foods.

It has been stated that, owing to the elimination of the embryo, with the resultant absence of vitamin E, the fertility factor, white bread is "at least in part" responsible for the hyponatality of those races which are "essentially consumers of white bread".

Vitamin E (the fertility vitamin) is especially abundant in the wheat embryo and since bread is consumed daily it offers a constant and abundant source of this vitamin. Unwarranted deductions should not, however, be made from its absence in modern bread.

Other diseases attributed to white bread are epidemics of jaundice, cases of pellagra and dental caries, while it is supposed to play a part in the origins of tuberculosis and certain forms of cancer, etc.

It is known (research made by CASTLE) that the principle which fights against pernicious anaemia has its origin in the action of the gastric juices (intrinsic factor). UNGLEY has proved that the various foods, besides meat, which contain the extrinsic factor, include the wheat embryo, although it contains proportionately much less of this factor.

The wheat ear therefore contains substances which could advantageously be obtained from bread.

Bread remains an incomplete element which might be richer in other nutritive elements besides starch; it might have other qualities, but the subject has been exposed to much unfounded exaggeration, forgetting that as a rule man does not live by bread alone.

WHITE BREAD AND BROWN BREAD.

White bread or brown? This delicate question has been examined by Prof. MANGOLD (Berlin) from the particular aspect of wheat bread as opposed to rye bread. His report concludes in favour of rye bread, and he is also in favour of high bolting percentages.

Bread should not be given to very young children, nor should the quantity consumed be excessive. According to L. BABONNEIK too large quantities of bread produce acid diarrhoea with iodophylic microorganisms, abundant intestinal gases and sometimes even atherepsy; this opinion is shared by A. BOHN, R. CLEMENT and R. D'HENOQUEVILLE.

Remarks made by correspondents in connection with bolting encourage the forecast that wholemeal bread will easily be the winner in this survey. J. COMBY advises Graham bread in preference to any other, this being a preparation consisting of 0.45 per cent. cellulose, while Parisian white bread contains only 0.14 per cent., and he observes that wholemeal flour may be used to make soups.

According to W. von DRYGALSKI and F. WIDENBANET, German doctors advise the use of brown bread in childhood. HEUPKE recommends its use after the third year. O. KAUFFAN-COSLA and R. McCARRISSON praise this type of bread. RIETSCHEL states that in Germany, during the war, much use has been made of flours with a high bran content and bolting up to 94 per cent., these giving good results with nursing infants.

Prof. ROCHAIX considers that no bread should be given to children under two years of age. After that age, bread is an excellent food for children as long as it is of good quality. Adults between 40 and 50 years of age should moderate their consumption of bread as it constitutes "a factor leading to obesity". Hence the imperative necessity, especially at this age, of being able to procure good bread which satisfies the appetite but which should nevertheless be consumed in small quantities. In fact, persons approaching the age of 50 undergo "a disturbance of the metabolism of fat substances characterized by a special aptitude of the organism to stabilize edible fats, but, above all to convert other foods, and especially carbohydrates, into fat substances. At this age, too, people are subject to a disturbance of the metabolism of glucides called by some practitioners "dysglucies", to avoid confusion with the term "diabetes" which should be reserved for the classical constitutional disease. This trouble is often improved by limiting the consumption of bread.

It may perhaps be of value to mention here a document prepared by an eminent medical authority, Prof. MOLVOZ. In this paper, the professor confutes, one after the other, all the arguments on which certain authors base their advice on the consumption of more or less wholemeal brown bread: higher proportions of nitrogenous matter, mineral salts, vitamins, etc. Space does not

permit of an extensive discussion of this report, which may, however be studied, but we will reproduce one of the principal conclusions resulting from a comparison of the nutritive value of white and wholemeal bread:

"In support of wholemeal bread, Prof. MOLVOZ says, there only remains one favourable prejudice: its somewhat laxative properties. This facility is however only acquired at the cost of loss in energetic value".

The chief characteristics of white bread from the standpoint of its content of nutritive principles, are the almost exclusive predominance of starch, an insufficiency of gluten, mineral salts, diastases and the almost complete absence of vitamins.

It is an almost purely starchy foodstuff, undoubtedly possessing high energetic value, but it should contain the greater part of the valuable elements found in the ear. It has therefore been deprived of a part of its nutritive value.

Bread should consequently retain the greater part of the gluten, diastases, mineral salts and vitamins found in the wheat ear. It ought to be "balanced".

These general and detailed observations will enable everyone to form his own opinion as to the factors which determine the quality of bread.

L.E.L.

Publications consulted:

- CERQUIGLINI Dott. S., Sul valore nutritivo del pane contenente determinate percentuali di embrioni di grano. *Quaderni della nutrizione*, 1938.
- ECKARDT Oskar, Das Wissen ums Brot. Leipzig 1938.
- HAEVECKER Herbert, Forschungsergebnisse 1938 über Getreide, Mehl und Brot. Leipzig 1939.
- LEGENDRE R., Alimentation et ravitaillement. Masson 1930.
- DELBET Pierre, La nocivité du pain blanc. *Bulletin de l'Académie de Médecine*, n° 6, 1938.
- MORHARDT, P. E., Usages du pain dans la petite enfance. Du Blé au Pain, n° 5, p. 71, 1937.
- STOKLASA Julius, Das Brot der Zukunft, 1917.
- PELSHENKE, Paul, Untersuchungsmethoden für Brotgetreide, Mehl und Brot. Leipzig 1939.
- ROCHAIX Prof., Le problème du pain. *Journal de Médecine de Lyon*, 1938.
- FLEURENT E., Les facteurs de la qualité du pain de froment. *Revue internationale de meunerie*, nos 3, 4, 1938.
- DONON Marcel, Pour une politique du pain. *Revue générale de l'Alimentation*, n° 7, 1938.
- ARPIN Marcel, Vers l'amélioration de la qualité du pain. *Bulletin de la Société scientifique d'Hygiène alimentaire*, nos 5 et 6, 1938.
- ORR I. B., The physiological and economic bases of nutrition. *J. R. I. Pub. Health Hyg.*, 2, p. 661, 1939.
- MC DOUGALL. E. J., Étude sur le pain dans quelques pays d'Europe. *Bulletin de l'organisation d'Hygiène*, Genève, vol. VIII, n° 3, 1939.
- SHERMAN, H. C., The Chemistry of Food and Nutrition, New-York, 1937.

MISCELLANEOUS INFORMATION

Production of Potatoes in the Mountainous Districts of France.

Degeneration diseases of potatoes are caused by filtrable viruses and are both inherited and incurable; further, the infection of healthy plants by diseased plants is both easy and rapid, the infection frequently being spread by an insect vector, most commonly an aphid. In regions where the conditions are favourable to infection, the disease spreads very rapidly and a variety containing 5 per cent. of infected tubers or less, when grown one year in such conditions, might well show an incidence of 90 per cent. the following year.

Certain regions are characterized by not being contaminating; these are, as a rule, regions with a harsh climate, either in the north or in mountains. As has been observed in Friesland, a high atmospheric moisture content may also be a favourable factor.

In order that a region may be regarded as non-contaminating, that is to say, favourable to the production of healthy potato plants, it must be possible to raise tubers there that produce healthy plants in successive years. Any seed coming from a region that does not fall in this category is suspect even if it has been produced from healthy seed the year before. C. CREPIN, J. BUSTERRET and R. CHEVALIER at the Dijon Plant Breeding Station have undertaken trials between 1932 and 1937 to find out whether the elevated districts of France are non-contaminating and therefore suitable for the production of seed potatoes. Their conclusion is that whilst in general the "plain" must be considered a contaminating region the "mountain" is less or not at all favourable to the spread of degeneration diseases. Infection is much less rapid and of less importance than in the plain and this becomes more and more marked at higher altitudes. The infection is not however entirely eliminated and it is not possible to dispense with selection even at high altitudes. As to the exact interpretation of "mountain" in this connection, it is probable that the altitude will vary considerably with latitude, the region under consideration and, perhaps, the aspect. In the present state of our knowledge, in a given region the minimum altitude above which it is possible to maintain a certain variety in good condition depends on several factors and particularly on the variety itself. Thus "Bintze" can be maintained in good condition in Morvan at 600-700 m. above sea level but in Savoie only at 1500 m; on the other hand "Erstling" can be infected easily at 500-600 m. above sea level in Savoie and it is more difficult to keep it free of disease at 600-700 m. above sea level in Morvan than at 1500 m. above sea level in Savoie.

The area under potatoes in France amounts to 1,400,000 hectares with an average yield of 100-120 quintals per hectare. The quantity of seed used each year is about 25,000,000 quintals. In 1937 France produced 214,000 quintals of seed and imported a further 1,084,000 quintals. This lack of good seed is the reason for the low yields. The use of the mountainous regions for the production of healthy seed potatoes would permit of their being sold in other regions at prices lower than that of the imported tubers. It would also be a source of wealth to the inhabitants and might check the depopulation of these regions.

Mulberry-growing in Indo-China.

The *Institut des Recherches agronomiques de l'Indochine*, is making an attempt to revive silk production in Indo-China and has chosen the site for an experimental field in the province of Quang-nam because silkworm rearing is still of importance in this area. MM. Louis CARESCHE and DANG-VU-LOC were appointed to make a survey of the cultivation of the mulberry tree and of silkworm breeding in this province. The results of their enquiries have been published in the form of a very interesting article which appeared in the *Bulletin économique de l'Indochine* (1939, Fascicule 6, pp. 1171-1230), from which we have obtained the following information concerning present conditions as regards mulberry growing in the province of Quang-nam.

The mulberry tree is cultivated in Quang-nam in two distinct areas of very unequal importance: in the alluvial soil along the river banks, where the industry is characterized by the cultivation of the dwarf mulberry, and in the semi-mountainous areas characterized by the arborescent mulberry. The former is much the more important from the point of view of sericulture.

(A) *Mulberry cultivation along the river banks.* — Mulberry groves are found in two distinct types of soil along the river banks: along the recently formed low alluvial banks and along the old high alluvial banks. The former are constituted by formations lying inside the main bed of the rivers: the latter by formations outside the main river bed. All these alluvions, although of the same nature, vary considerably in their composition; generally speaking, they are more or less sandy, while their fertility consists much more in their coolness and the movement of the water than in their content of fertilizing elements which, on analysis, is found to be fairly low. Mulberries are not the only product of these alluvions: the groves are sometimes allied with maize, rice and other food crops and sometimes with maize or cotton fields, sugar cane plantations, rice fields, etc. There is consequently a certain amount of competition between these crops and this is regulated by the requirements of the plant and the economic conditions prevailing at the time.

The variety of mulberry which is most commonly grown is suited to light soil and its production depends more on the coolness of the soil than on its fertility. The soil must be neither too sandy, when it is too arid, nor yet too clayey, because in this case it retains the moisture too long during the rainy season and is better suited to a rice crop. Maize grows well in the same type of soil as the mulberry, but requires less water, while on the other hand it is adversely affected by floods. For these reasons, the mulberry groves are planted on the lower and middle slopes of the low alluvions. Whenever the level becomes too high or when the strip of alluvial soil becomes excessively wide, creating a distance from the water, maize can then be planted. Mulberry groves unmixed with any other crop are only found on banks which are either rich in clay or very low-lying. The usual method adopted is that of the mulberry grove allied with another crop; between the rows of trees one finds one or more maize plantations, or a rice crop which goes through a part of its growth at the same time as the second maize crop. There is some risk involved in the cultivation of the last two crops owing to the danger of drought and floods. When maize is the main crop, an attempt is made to obtain three crops simultaneously with those of the mulberry, adding haricot beans to the first two crops, and always cultivating rice with the last. The best yields are obtained from the mulberry on these alluvions.

Only light soil at a medium level and of good quality is used for growing mulberries and maize on the old high alluvions. Here mixed cultivation is the rule, the mulberry

being associated as before with one, or rarely two maize crops, or else with some food crop and always with rice. Along the high alluvions the mulberry does not seem to suffer any more from drought than on the river soil. There is great competition with other crops and the mulberry groves are far from occupying the greater part of the available land. These groves have the great advantage of bearing their leaves later than the trees on the low alluvions and at a time when the latter are submerged by the small floods.

The mulberries cultivated along the river banks belong to the variety which usually has serrate leaves, especially on the young shoots, while the old shoots often have simple leaves, lanceolated and rather small, light green in colour, thin and tender. The stems are slender with grey bark and ramify easily. This species of mulberry is very hardy; during the dry season the trees send out buds as soon as the ground is slightly cool; they thrive after grafting and can stand floods and silting-up. The agricultural services in Annam have made attempts to introduce the Chinese mulberry with large leaves. On certain fairly dense areas of the high alluvions this tree seems to grow advantageously; it manages to grow even on the low alluvions in spite of the effects of drought, but it is to be feared that it suffers seriously from floods.

The Quang-nam mulberries are planted in rows forming thick hedges distributed in clumps at varying distances. In unmixcd mulberry groves the spacing between the lines amounts to about one metre; where a mixed crop is grown, the distance varies from 1 to 3 metres according to the space reserved for the other crops and to the nature of the soil. Along a single row space between each clump is generally between 50 and 60 centimetres.

Planting generally takes place in December and January after the floods are over and towards the end of the rainy season when farm work begins again. Three different methods are used, each adapted to the special condition of the soil: in arches, in straight cuttings or in horizontal cuttings. The first method is best suited to cool soil with little sand on the surface and is chiefly practised on the high alluvions. The second method is more general on the low alluvions while the third is only suited to very damp soil and is rarely practised. The cuttings employed are as a rule taken from the stems of mulberry trees grown on the high alluvions as they are the strongest.

Generally speaking no manuring is done to any of the crops grown on the low alluvions; on the high alluvions cow or pig manure is almost always applied in the holes or furrows where the crop is planted.

The only care necessary is to keep the soil clean and free on the surface by means of weeding and hoeing.

Although the mulberry trees spring up rapidly, it is only after the maize crop has been harvested at the end of March that the production of leaves is abundant. Picking can be repeated every 30 or 40 days according to the thickness of the foliage. At the beginning of June the stems may be as high as 2 metres; the second maize crop, sown immediately after harvesting the first, is then being brought in; by the end of July the growth of the maize and rice crops hampers the progress of the mulberry and encourages scale infestation. The stems are then pinched to encourage the growth of small branches putting out tiny leaves which are then picked. At the beginning of September the mulberry trees on the low alluvions have almost stopped growing and only a few leaves remain to be picked. By the beginning of October they begin to be submerged while the trees on the high alluvions are also worn out. This is the end of the season for sericulture.

When new planting is carried out, the groves are pruned and set in order. Pruning consists merely of cutting the stems obliquely on a level with the ground. The

lower part of the stem is then freed from the recent covering of alluvial soil in order to facilitate the sprouting of the shoots. Any clumps which are missing are replaced and the grove then receives the same care as the young plantations.

As is to be expected owing to the variety of soil conditions and the unsettled climate, the yield obtained from the mulberry groves is extremely variable. On the low alluvions the groves where no other crops are grown may give as many as 5 or 6 crops of leaves, amounting to between 5,000 and 10,000 kg. of leaves per hectare; the average yield is 8,500 kg. per hectare. Groves mixed with other crops give 5 or 6 crops with an average yield of 6,500 kg. per hectare. On the high alluvions the mixed groves, which are the only form in which the plant is grown, also give 5 or 6 crops with an average yield of 3,500 kg. per hectare. From a study of the production costs involved it is certain that the mixed type of cultivation is the most profitable in all the riverside areas suited to growing mulberry trees. It is however interesting to note that the crop most widely cultivated along with the mulberry is maize, which constitutes about 38 per cent. of the additional crops grown with the mulberry on the low alluvions. The conversion of mixed mulberry plantations into simple groves is therefore quite out of the question.

(B) *Mulberry growing in the semi-mountainous area.* -- Arborescent mulberry trees are planted at the foot of the mountain slopes and on the hillocks, as well as on the high alluvial terraces found in the valleys. The trees are mixed with areca, cinnamon trees, tea, abrasin, etc. Their numbers vary from a few trees to even a hundred in a single plantation. Under these conditions the plants grow into real trees, with spreading branches and may even attain 8 or 10 metres in height. No regular plantations are established on the alluvial terraces. In any case these plantations are quite small, numbering 100 or 200 trees, occasionally even 300. Here the trees do not grow very high, and are, in fact, shrubs of 3 or 4 metres in height. This is probably due to the soil conditions prevailing and to the fact that they are planted fairly close together. Food crops are grown here under the mulberry trees. Arborescent mulberry trees seem to form quite a different group when compared with the riverside mulberry trees. Reproduction is carried out by means of budding or layering towards the end of December or in January, at the close of the rainy season. The trees are planted at a distance varying between 2 m. 50 and 3 m. in both directions. When the natural shade is insufficient, bananas may be planted beside the mulberries to protect them. The trees are never pruned for shaping or reproduction; they therefore grow in irregular shapes and are covered with parasitic plants. The soil is maintained by planting intercalary food crops. The mulberry trees never last more than 20 years in these plantations. They grow rapidly, but picking does not commence until the third or fifth year in order not to weaken the tree. Arborescent mulberry trees bear leaves throughout the year, but two vegetative periods may be distinguished, one from December to April, the other from June to the end of September. Moreover, the tree does not put out its new leaves as rapidly as the dwarf mulberry. Consequently only 4 or 5 main crops of leaves are obtained yearly. The yield of arborescent mulberries is still so irregular that it is impossible to give a general idea of the output. Individual yields show that the output of leaves may be estimated at between 5,000 and 7,000 kg. per hectare if all the trees are visited during each period of picking, but this is not the case at the present time. The cultivation of the arborescent mulberry is as yet of no economic importance, as the owners of the trees state that they find their other crops more profitable, or that they have no time to cultivate this plant.

Progress of poultry-farming in Hungary.

The Hungarian "Stud" information bulletins published on December 29, 1939, and January 12, 1940, contain some interesting data concerning the progress of poultry-farming in Hungary during the past 20 years. Poultry-farming made considerable progress between 1922 and 1931, during which period large fattening establishments were built, as well as others for preparing dressed poultry (refrigerating plant, etc.). Progress was interrupted, however, when Austria lost much of her purchasing power owing to the severe depression through which the country was passing and when Germany, in pursuance of her self-sufficiency programme, ceased to import supplies from abroad. The following figures give some idea of the alteration which took place in conditions: in 1932 Hungary only exported 130,000 quintals of dressed poultry, although she had sent 185,000 quintals to foreign countries in the previous year. The decline was distributed as follows: 14,000 quintals less exported to Germany, and 32,000 quintals less to Austria. During the same period the quantity of eggs exported fell from 120,000 to 63,000 quintals.

During this time of extreme difficulty for the Hungarian poultry industry, conditions were improved by the opening up of new outlets in Great Britain, where Hungarian turkeys have been long known. This alteration in the trend of exports produced satisfactory results: Hungarian exports of dressed poultry to Great Britain, which had totalled 44,088 quintals in 1929, rose to 86,972.4 quintals in 1933, Hungary then taking first place in British poultry exports, even passing ahead of Russia.

Although a decline was registered during the next two years as a result of measures adopted by Great Britain to protect the market for the Irish output, in 1937 Hungarian exports of dressed poultry to Great Britain rose once more to 105,857 quintals. Very little change occurred in the volume of Hungarian exports in 1938 and 1939 and the present situation may now be summarized by saying that the British market has become of capital importance for the export of Hungarian poultry, while the Austro-German market now takes a much lower place.

This alteration has had repercussions on the trends of production. In the first place, great progress has been made in the rearing of guinea-fowl; prior to 1931 this industry was so small that it was not dealt with separately in statistics, but by 1937 12,244 quintals of guinea-fowl were exported to Great Britain. On the other hand, the production of geese, the principal outlet for which was Vienna, showed a marked decline, while the rearing of turkeys had increased considerably. Nowadays one sees large flocks of half-wild turkeys on Hungarian farms; these fowl are not penned but wander about seeking their food in the fields under the care of a guardian. They are brought in to the farms for fattening only in the autumn, about a month before killing. Deliveries of Hungarian turkeys to Great Britain commence about November and continue until the middle of December in time for Christmas in London.

During the past few years Hungarian exports of dressed turkeys have fluctuated between 43,000 and 50,000 quintals, this last figure having even been exceeded in 1933 and 1934. Small farmers earn a good income from turkeys (profits from the export of this class of fowl were estimated at 6 and a half million pengös last season), and everything is being done to encourage this branch of poultry-farming which has made such great strides in so short a time.

Utilization of kitchen garbage for feeding pigs in Germany.

According to statistics published by the "Reichnährstand", the auxiliary food Service "Ernährungshilfswerk" now runs 1037 fattening establishments and 250 others are in course of construction. The kitchen garbage utilized in these establishments is obtained from the wastage of food consumed by 28.5 million people and amounts to about 17,000 quintals daily. This quantity is sufficient for fattening 184,000 pigs every six months and produces 28.3 million kg. of meat, which, under the rationing system now in force, provides food for 746,000 persons.

I. M.

Refrigerating car for the transport of hung beef (half-carcases).

In the February, 1939, number of the "Revue générale des Chemins de Fer," M. Chevalier describes a refrigerating car for the transport of hung beef (half-carcases). This car is an entirely novel idea and has been planned in collaboration with the Rolling Stock Service of the Northern Region of the S. N. C. F.; it was built by the Établissements Cadoux, Beauchamp. The half-carcases are hung vertically and the essential condition is that there must be a free space 3 metres in height below the hooks for hanging the beef.

This condition has been fulfilled by utilizing to the full the moulding which runs round the top of the car and by arranging a well 7 metres long between the supports of the chassis; the lower part of this well is only 300 mm. above the rails. Platforms situated at each end of the car may be used for holding meat in baskets or metal cases.

This refrigerating car consists of:

- two ice baskets;
- ventilating apparatus with casings for the circulation of air;
- a suspension device enabling the carcasses to be easily kept in good condition;
- 3 doors on each side, the central door being reserved for the reception of the hung carcasses, while the end doors give access to the platforms.

G. R.

Control of fraudulency in the competition of margarine with butter.

The following is taken from the report of Dr. A. J. SWAVING on fraudulency in the competition of margarine with butter, presented to the Examining Committee of the International Dairy Federation, Zurich, on June 15, 1930.

BUTTER VERSUS MARGARINE. (PRESENT POSITION).

The margarine industry dates from about 1870 and is due to the initiative of Napoleon III who required a fat at a moderate price for the working classes; the problem was solved by Mège-Mouriez.

The development of this industry gave rise on the one hand to the adulteration of butter and on the other to its unfair competition with butter by fraudulent methods leading to the sale of margarine as butter or as its equivalent.

Owing to legislative and other measures adopted by most of the dairy countries and those importing butter, adulteration is no longer of great importance, while on the contrary fraudulent competition to the detriment of the dairy industry continues almost everywhere in written publications and illustrations.

It must be recalled here that certain countries have made it compulsory to manufacture mixtures of butter with margarine in order to get rid of a surplus of butter. As a result of such a measure, the public acquires the habit of eating margarine whilst it loses the taste to appreciate butter.

To remedy this, it is necessary to establish an effective distinction between butter and margarine.

* * *

In choosing the measures to be adopted, it is necessary to bear in mind that the manufacture of margarine is important industry, however, it must not be forgotten that:

(1) The initial material for the manufacture of margarine is a product of foreign origin; oils, vegetable fats (coconut, etc.), animal fats, fish oils (dog-fish, whale, etc.).

(2) Butter is a natural product derived from the soil of the dairying countries; it affects not only the interests of the dairy but also those of agriculture (stock-breeding, etc.): it is of national interest.

Therefore consideration must be given to the fact that:

(a) Margarine is an industrial product which has nothing in common with butter.

(b) Margarine, with or without vitamins will never equal butter with regard to taste, flavour, appetising qualities; that is to say to those qualities which favour good digestion.

PROPOSITIONS.

At the IXth International Dairy Congress, held at Copenhagen in July 1931, M. A. M. Loomis, Delegate of the National Dairy Union, Washington D. C., U. S. A., presented a report on "World competition between vegetable oils and dairy products" drawing attention to the danger of the increasing use of vegetable oil products in regard to the marketing possibilities of dairy products. His absence from the meeting of the 4th Section of the Congress on July 14, 1931, prevented discussion of this Report.

However, Mr. F. H. Taylor, Delegate of the Dairy Division of the Ministry of Agriculture of New Zealand raised the question of the invasion of margarine into the butter market, in his letter of July 18, 1938, addressed to the Permanent Bureau of the International Dairy Federation.

Any general economic action against margarine as such seems very difficult.

It appears most urgent to introduce into the legislation of the different countries of the world definite rules (where these do not exist) to put an end to fraudulent competition and also to restrict margarine to the place it should occupy as an industrial product.

With this object in view an inquiry together with an explanatory note had already been sent September 1, 1938 to the national committees.

The results were presented to the special meeting of the Executive Committee of the Federation held in London on September 27, 1938, where the question raised by Mr Taylor was discussed.

A further note on the margarine question appeared on November 9, 1938, and was sent by the Executive Committee of the Federation to all national committees on December 30, 1938, with the following mention.

«To promote discussion on the question we have the honour to send herewith another note by Dr. Swaving asking you to be good enough to consider it and reply before March 1, 1939. Dr. Swaving will then draw up a general report which will serve as the basis for discussion at the next meeting of the Examining Committee of the Federation ».

This communication was followed by a further note in March 1939.

«This note formulates proposals designed to raise legislatively with regard to margarine the possibility of proceeding against fraudulent advertisements and propaganda whether written, pictorial or spoken.

It was submitted to the national committees, and 14 replies have been received from the following countries: Germany, England, Denmark, Finland, France, Italy, Norway, Luxembourg, Holland, Belgium, Switzerland, Australia, Canada and New Zealand.

Most of the countries approve proposals 1, 2 and 4; some oppose proposals 3, 5 and 6.

With regard to overseas countries, it should be noted that in Canada the manufacture of and commerce in margarine are prohibited, Australia expresses no opinion on the various proposals, and New Zealand does not approve any of the proposals excepting No. 1.

As part of the proposals already exist in the laws and rules of certain countries, little difficulty is experienced in arriving at a limited uniformity in acceptable terms to put an end to the misleading manoeuvres of certain sections of commerce in margarine.

With this object in view, I am asking your approbation for proposals 1, 2 and 4 in order that the Permanent Bureau of the International Dairy Federation may ask the International Institute of Agriculture in Rome to call an international convention on this matter ».

The report was discussed at the 13th plenary meeting of the Examining Committee of the Federation at Zurich on June 15, 1939, and the following recommendations were adopted:

(1) The manufacturers of margarine should be compelled to label their product "Margarine" in letters at least double and at least as numerous as the other wording (or as the remaining word, or as the fancy names).

(2) Manufacturers and merchants of margarine should be prohibited from making use of expressions derived from the dairy industry in their propaganda, in advertisements, shop windows, placards, signs, pictures, announcements, posters, inscriptions, statements by radio and other methods.

(3) In addition to the guarantees in 1 and 2 above, it is recommended that packing paper for margarine be submitted to an official control.

(4) Proprietors or managers of hotels, restaurants boarding-houses, bread and cake shops, as well as directors of boarding schools, convalescent homes, and hospitals using margarine are obliged to make this known by a poster.

(5) Manufacturers and merchants of margarine should be prohibited from mixing butter with margarine.

G. R.

BOOK NOTICES *

AZZI, G., *Trattato di ecologia agraria* (Agricultural ecology). — Torino, 1939, Società editrice internazionale, 594 pp., 55 illustrations. Price: 50 lire.

[The author, already well-known for his work entitled "Le Climat du Blé" now offers his readers a complete review of his former publications concerning the relations of the cultivated plant with its environment. He has widened our knowledge of agricultural ecology and brings into this field certain subjects which have so far been treated as poor relations by the representatives of other sciences, geology and meteorology in particular.

The book is divided into three parts: agricultural climatology, soil, the plant. In the chapter on agricultural climatology, the author explains his well-known opinions on "meteorological equivalents" and proves the existence in the case of each meteorological factor, of a restrictive value, optimum, excessive or insufficient. By determining these values for the different phases of the growth of a cultivated plant and for a given region, he obtains a "climascopie". This idea is undoubtedly very attractive and acquires practical value when dealt with by an expert, especially when used in combination with the calculations proposed by the author, although these latter are undoubtedly somewhat complicated.

It is most satisfactory to note that the author has also devoted attention to the new information available concerning photoperiodism and vernalization or jarovization. Particularly interesting are his deductions concerning the relation between the photoperiod and resistance to cold.

Besides the thermic and the luminous stage in vernalization he distinguishes a lunar stage (*stadio lunare*). The author views the problem of vernalization from the objective standpoint, especially the problem of its practical use. On the other hand, he is dealing with questions which are mostly of a hypothetical nature when he speaks of the action of influencing the embryonic phase (*fase prestadiale*) of a generation which is still almost in its initial state on the mother-plant and of its retroactive effect on the subsequent growth and formation in general.

A long chapter is dedicated to the reports on "Meteorology, noxious insects" and "Climate-man" but microclimate is not discussed at length as being foreign to the subject of agricultural ecology.

After a brief description of the part played by soil as an ecological factor in its relations to climate and the plant, the A. proceeds to discuss the plant as the object of agricultural activity. Among the mass of material set forth by the A., special mention may be made of his geographical research concerning the influence of meteorological conditions on the value of cereal grain used as seed and his attempt to give an ecological classification of cultivated plants. Particularly deserving of praise are his considerations concerning the relation between agricultural ecology and applied genetics of outstanding interest is his clear description of the theory of the Lysenko phases with their practical consequences in connection with plant selection.

The book concludes with some considerations on the origin and spread of wheat and an exhaustive bibliography.]

N. G

* Reviews of books presented to the Library appear under this heading.

BENNETT, Hugh Hammond, *Soil Conservation*. — London, 1939, Mc Graw Publishing Company, Ltd., IX, 993 pp., 358 fig.

[For some time now, both farmers and experts in the United States have recognized that erosion constitutes, in its various forms, a very grave danger, not only for the future of farming, but also for the whole economic life of the nation. It was the great hurricane in 1934, however, which awoke the whole nation to the importance of the danger. Dust-laden clouds arose from the arid, sun-baked plains of Western Kansas, Texas, Oklahoma and East Colorado and were borne eastwards across two-thirds of the continent. For the first time in the history of the United States particles of soil from the great plains darkened the skies of the capital, the dust penetrating through the New York windows and finally losing itself in the clouds which eventually broke over the ocean carrying with them an incalculable volume of fertile soil. The problem of erosion thus took form as a national problem of prime importance.]

Since then attempts have been made to discover the causes which, added one to the other, have led in the course of one and a half centuries to loss of fertility over a large area and which are now transforming once flourishing farms into sterile semi-desert areas broken up in every direction. Numbers of articles and bulletins have been published on the subject, films and the wireless have spread information concerning the gravity of the problem and the measures for combating its progress. The word erosion which had up to then been employed mainly by geographers and geologists, now took on a new significance. The alterations in the morphology of the earth which had previously been considered as taking several centuries to accomplish, may actually take place during the life of a single generation, if the forces of nature are assisted by badly managed farming.

During the past five years the United States Congress has promulgated a series of decrees providing the broad lines of a programme for activities directed towards soil conservation. The execution of the programme, originally entrusted in 1933 to the Soil Erosion Service attached to the Department of the Interior, was later transferred, under the name of Soil Conservation Service, to the Department of Agriculture. During its first ten years of activity this institution has rendered signal service to the people of the United States. The following lines of action have been pursued: (1) Campaign against erosion including research concerning the character, causes and effects of erosion, drafting of plans to determine measures for protecting and conserving water, local demonstration showing the efficacy of proposed measures, co-operation with local services working in accordance with the laws of the States, and finally distribution of propaganda leaflets. (2) Purchase of threatened areas. (3) Campaign against floods. (4) Improvement and development of water supplies in arid and semi-arid regions. (5) Development of private forests owned by farmers. (6) Development of rational methods of drainage and irrigation.

Mr. Hugh Hammond Bennett, who is at present chief of the Soil Conservation Service, gives us a general review of all the problems of soil conservation. His book, while of an encyclopaedic nature, is nevertheless easily read and one realizes, in going through its pages, that the vast material possessed by the Soil Conservation Service has made it possible for the A. to deal exhaustively with all these problems. The work is divided into two sections: the first deals with the problem of erosion, the second with conservation methods.

Obviously the A. has primarily made a study of the problems as presented in the United States, where these studies have made greater progress than elsewhere. But he also understands clearly that the question of soil conservation is of interest to the world at large. The second chapter is, in fact, devoted to general questions. Under the title of "Erosion and Civilization", a description is given of agriculture from ancient times and of the vanished civilizations in Mesopotamia and Syria, the Roman Empire, etc. Foreign countries are again dealt with in Chapter 41 "Foreign erosion problems". These two chapters, although incomplete, (the reader will find more exhaustive information on the subject in the book by G. V. Jacks and R. O. Whyte already reviewed in this Bulletin), show nevertheless that the United States are interested in the world aspects of soil conservation, an interest which was recently demonstrated on the occasion of the XV General Assembly of the Institute].

GÖKGÖL, Mirza Hacizade. *Türkiye buğdayları (Nie türkischen Weizen)*. — Istanbul. Vol. 1: Devlet matbaası 1935, 436 pp. 56 illustrations, 4 maps. German summary pp. 407-436. Vol. 2: Tan matbaası 1939: 955 pp. 104 illustrations, 1 map. German summary pp. 930-955.

After the important publications by Russian scholars belonging to VAVILOV's school concerning wheat types in Russia, Armenia, Palestine, Abyssinia and the Mediterranean Islands and the paper by PAPADAKIS on Greek wheats, the above work in two volumes by Mirza GÖKGÖL is a most satisfactory completion of our information as regards wheat types in the Near East and the Mediterranean region. This book is also an introduction to wheat-growing in Turkey and supplies some very interesting information concerning Turkish agriculture, hitherto not sufficiently well-known. As an introduction to Turkish agriculture, it has the advantage over ZHUKOVSKY's book (*La Turquie Agricole*), Leningrad, 1933) of having been written by a son of the soil, who combines a delicate sense of the human factor with a precise knowledge of agricultural conditions and an exact understanding of the scientific aspects of the question.

The first volume deals with the general situation as regards the cultivation of wheat in Turkey. Since this country did not export wheat until a few years ago, the importance of the wheat crop may easily be under-estimated. In reality, the fact that almost half the arable area is sown to wheat proves the importance of this crop in Turkey, although it is true that the author mentions later that the arable land only represents $7\frac{1}{4}$ per cent. of the total area of the country and that the wheat yield only amounts to between 7 and 8 quintals per hectare owing to the primitive methods adopted in tilling the soil.

The Ministry of Agriculture at Ankara has divided the country into 10 climatic provinces. The author adopts these divisions in discussing the special conditions under which wheat growing is pursued in the various parts of the country, all of which differ considerably one from the other as regards soil conditions and climate.

Special chapters are devoted to the technical aspect of farming and to the properties and uses of wheat. The factors determining its value have been carefully studied in the new laboratories where exhaustive experiments have been made in breadmaking in order to serve as a basis for the new work of plant selection in Turkey and to stimulate the production and export of the qualities most in demand. In this connection the author makes some very optimistic forecasts.

In his second volume the A. attempts to determine and classify the extremely numerous species and types of wheat. He adopts KÖRNICKE's system of classification, as he recognizes, with all who before him have studied the systematics of wheat, that it is impossible to avoid using a schematic classification based on external characteristics. Following the example of FLAKSBERGER (*Flora of cultivated plants of U. R. S. S.*, Leningrad 1935), he nevertheless combines this system with the establishment of ecological and morphological types. He distinguishes, for instance, 17 of these types in the case of hard wheat and 11 in that of soft wheat.

About 1800 of wheats from all over Turkey are cultivated at the plant selection Station at Jesilköy, and these have been subdivided into about 15,400 types analyzed on the basis of resistance to cold, early ripening, resistance to drought, resistance to lodging, soil requirements, etc. Special experiments are being carried out over a period of years to determine the value of the physiological characteristics of these wheats.

All this work has led to the production of a large number of new varieties. The number of varieties of hard wheats (*Triticum durum* subsp. *expansum*) cultivated has thus been increased from 64 to 110 through the discovery of 46 new varieties. With the exception of 6, all these varieties were found in Asia Minor. The A. also throws an entirely new light on the question of the region where hard wheat originated. According to VAVILOV, whose opinion is now accepted everywhere, the origin of a species should be sought wherever this species is found in the greatest number of forms. For this reason the A. considers that hard wheat originated in Asia Minor, although this opinion is opposed to that admitted up to the present by VAVILOV, who fixed the centre of origin in Abyssinia. The A. is also of opinion that, if the centre of diversity may also be considered as the centre or origin of the species in question, it must not only present the greatest number of types, but must also be characterized by the greatest accumulation of dominant genes and by the presence of wild types.

In order to judge the question of the origin of tetraploid wheat, he considers it is important to note that the wild type of this group, *Tr. dicoccoides*, is found in Anatolia.

In the group of hexaploid wheats, the author has established 113 new varieties of *Tr. vulgare* in Anatolia. Out of a total of 270 varieties now known, 223 are found in Anatolia and the A. therefore considers that Anatolia is the region of origin of this wheat also. The same may be said for *Tr. compactum*. This species is widely distributed throughout in certain parts of the country, in the Vilayet Eskisehir, for instance, where it is found in 70 per cent. of the area sown to wheat.

As a result of his studies, the A. considers that Asia Minor is not only the region of origin of the groups of primitive diploid wheats but also that of the tetraploid and hexaploid groups, representatives of which are found in the form of cultivated wheats in every part of the globe].

N. G.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

PRINTING OFFICE 'CARLO COLOMBO' — ROME, AUGUST 5, 1940.

MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

DIFFERENT ASPECTS OF SOIL CONSERVATION POSSIBILITIES OF INTERNATIONAL COLLABORATION

The chief problems of soil conservation are noted and briefly discussed. These problems vary considerably in different parts of the globe. The various aspects are treated and the suggestion is put forward that, through the intermediary of the International Institute of Agriculture, international collaboration on this important question should be attained.

Introduction.

Soil conservation has attracted the attention of the agricultural world to an even greater extent in the decade 1930-1940 than formerly. It is clearly seen that the protection of cultivated land against erosion and deterioration factors, constitutes, in practically all newly exploited countries, a fundamental problem, which, though varying in different aspects, should be studied from the general viewpoint. Soil conservation measures form an essential part of the activities of the different Governments which have to combine propaganda and dissemination of information and facts acquired, with co-ordination of the efforts of different government services and private individuals. Organizations such as the Soil Conservation Service established in the United States, and the "Bonifica Integrale" in Italy, are examples of this type of co-ordination. Similar organizations are to be found in other countries. There are considerable differences in the manner in which the problem of the rôle of the Government in this campaign has been solved. It is also seen that control measures vary from country to country, not always because of varying physical conditions of the soil, but also because results are little or inadequately known outside the country where they were obtained. For example, the work of the Soil Conservation Service appears to be practically unknown in Europe.

International co-ordination, therefore, is necessary. The land should be considered as the common patrimony of man; all nations have a common interest in its conservation which will not be achieved until the enormous losses, in part irretrievable, due to erosion and other factors, are fully realized.

It is evident that the work of assembling and co-ordinating the documentation regarding soil conservation devolves on the International Institute of Agriculture. The Institute should also make every effort to co-ordinate the results obtained in the different countries.

It is proposed to discuss at the end of this article the work which the Institute could carry out with the restricted means at present available, and that which could be assumed when, peace conditions having returned, important questions regarding the welfare of man, will automatically come to the fore. It may be asserted that soil conservation is one of the basic factors on which mutual understanding among the different peoples depends.

The problem of soil conservation has become of primary importance in countries of recent, or relatively recent colonization, for example, the United States, South America, Africa, Australia and the Asiatic colonies. It is for this reason that the initiative of placing soil conservation on the programme of work of the Institute originated from the Section of Tropical and Subtropical Agriculture; the members of this Section, in their work of selecting and abstracting the different publications, encounter, almost daily, considerable information on this subject. It must not be taken from this, however, that the problem only regards tropical and subtropical countries.

Soil conservation, new problem in countries of recent colonization, problem of long standing in countries of ancient civilization.

In the first chapter of the work, 'The rape of the earth', G. V. JACKS shows that progress in science and transport methods has enabled, during the last century, European peoples to penetrate to the most distant corners of the globe to settle and cultivate the land. It is to be regretted, however, that the European colonist, in general, knew little about cultivating land under weather and soil conditions entirely different from those of Europe, and did not take environmental conditions into account. On the other hand, the rapid expansion in colonization did not facilitate the formation of a solid farming class, which really understands the intrinsic value of the soil. In many cases, the industrialization of agriculture, and large estates are factors which lead to soil deterioration. Here the main object of the owner is to obtain immediate profits without any thought of making a steady living for himself and for his heirs.

In the United States, the position in 1938 is frankly stated in the yearbook of the Department of Agriculture as follows: "Over 37 per cent. of the total area of the U. S. A., erosion was slight (that is to say, less than a quarter of the soil has been lost since occupation); over 41 per cent., erosion has been moderate (loss of from one to three quarters); 3 per cent. of the land has been completely destroyed, making tillage impossible; 7 per cent. of the land is non-arable (deserts, cauyons, etc.), much of which has been subjected to excessive grazing".

As another example, mention may be made of a South American country. A French writer describes a region of Brazil, where formerly sugarcane cultivation was flourishing, as follows: "There is nothing to remind the traveller of the former wealth, first derived from sugarcane and later from coffee; the hill slopes are bare or covered with 'mato' (scrub) which develops slowly; the lands bordering the Parahyba are given over to different crops; rice, cassava, potatoes,

beans. Coffee plantations are no longer to be found in this district, but have shifted towards the mountains or 'serras' which form the southern frontier of Minas Geraes. If Saint-Hilaire were to repeat his tour, he would not recognize the place of his pilgrimage nor find any trace of that which enthused him in 1819".

These are two examples; but the decline in soil fertility is a problem which, under various aspects, is to be found in all countries of comparatively recent colonization, it concerns South Africa as much as Australia.

The position is entirely different in the countries of ancient civilization. In Northern and Western Europe, erosion has never played a predominant rôle. Here, the importance of forest conservation has been fully understood since remote times. This is the reason for the general indifference in Europe to the world wide question of soil conservation. Soil losses in America and Australia are of little concern to the French or German farmer. This reasoning, however, is erroneous, as a healthy agricultural population increases to such an extent, that after several generations of peaceful life, the land can no longer support all the descendants of rural families. Consequently, the exodus to the towns which leads to overcrowding of these centres. Sooner or later, in sound agricultural regions, the need for new land becomes imperative. It is of the greatest importance, therefore, that the overseas' regions adapted to agriculture should be carefully maintained and not transformed into deserts after a few generations as was the case in the past.

Let us turn our attention to the countries bordering the Mediterranean, from Egypt and Palestine up to Spain.

It is highly probable that the fall of the ancient empires of Babylon, Assyria, Persia and Carthage was partly due to the extension of deserts caused through the destruction of the primeval vegetation. The disastrous consequences of the deforestation of the Apennines during the time of ancient Rome can still be seen to-day. On the other hand, it is now found that, in the majority of the Mediterranean countries, cultivated land is no longer subject to the danger of erosion to the same extent as in the United States. It would appear that what scientists engaged in plant sociology call the climax point, has been reached. To put it more simply, all the transportable parts of the soil have already been removed, either by wind or water, in the past. For the most part, cultivated land is now found in regions less exposed to soil losses or erosion by wind. The problem of soil conservation cannot be neglected, greater importance, however, is given to the difficult task of recovering lands formerly fertile but destroyed by the forces now at work in countries of recent colonization. To avoid errors, this land recovery (land reclamation in Italy, colonization of Palestine, North Africa, etc.) should profit from the experience of new agricultural countries.

The countries of ancient Asiatic cultivation, taking into account India and China only, are faced with a different series of problems. In India, the principal causes of soil deterioration are, deforestation and overgrazing. The rapid increase in the population under British rule led to intensified cultivation; poor soils were cleared and the fallow periods shortened, depriving the land of the rest periods imperative in a tropical country. This increase in population

—approximately three million per annum—takes place chiefly in the regions suitable for colonization, *i. e.*, regions where the rainfall is not excessive, and having natural grasslands. An excessive rainfall together with conditions unsuited to stock-breeding, have restricted agricultural expansion in other regions. Favourable regions being over-populated, the excess population spreads to the transition zones where the grasslands persist if treated properly, though they are difficult to restore if neglected. It is only too frequently found that the natural grass cover has entirely disappeared and the stock have to resort to the leaves of shrubs and trees for nourishment. It is comprehensible, therefore, how erosion, following the disappearance of forage plants and the destruction of trees and shrubs, has transformed former agricultural regions into deserts. Control measures, even the most elementary, in many instances are impossible owing to the extreme poverty of some villages, where it is extremely difficult to procure the necessary funds for carrying out protection operations.

In China, the intensive agriculture of the South, where a dense population depends almost entirely on the products of the soil, forms a marked contrast with that of the North-West, the loess region, cradle of the Chinese civilization, but for the greater part ruined by wind action. The loess of aeolian origin, however, constitutes one of the most fertile soils of the world; but at the same time is highly susceptible to water and wind erosion, if not covered with vegetation. The Hwang Ho, which drains the loess regions, has a raised bed owing to the mass of material transported by the water and flows through densely populated plains, situated at a level below that of the river. Consequently, there is a constant risk of severe flooding, one of the chief causes of dire famines. The terraces which were constructed in remote times have been gradually destroyed and other control measures are unknown. It has been found that the inhabitants of the plains exposed to floods suffer more than those of the mountainous regions, where the fields are destroyed through gullying. An effective control of the Hwang Ho appears to be a superhuman task, as it would not only be necessary to regulate the flow of the river but also to improve the mountain regions where the erosion of unprotected areas is the source of all the trouble.

In the South, the rice-growing region, problems are more simple. The irrigated rice fields are always laid out in the form of terraces. Terracing, employed with the object of retaining the irrigation water, is also an excellent anti-erosion measure. It is found, in fact, that in the greater part of southern and central China, all the soil has been removed through the action of water or wind, with sole exception of the soil in the rice-fields. On the other hand, erosion has led to much mountain soil being transported to the plains, *i. e.*, to the rice-growing centres.

Japan differs from China. Natural conditions — steep slopes composed of volcanic matter, exposure to storms — however, favours intensive erosion. But nature has been checked and forest conservation in particular has given excellent results.

The tropical countries which concentrate on the production of industrial crops such as coffee, tea, cacao, rubber, etc., must also be taken into considera-

tion. In many cases, the European planter has not realized the dangers of erosion and soil exhaustion. Mention may be made of Ceylon where the system of clean-weeding practised in the tea and hevea estates led to the loss of a considerable part of the excellent mountain soils. The English specialists who have visited the Netherlands Indies in recent years, agree that there is no other colony where the necessity of soil conservation has been so completely understood. Mention may be made of the use of cover plants in the rubber estates which has now become general; terracing in the coffee and tea estates and other measures, and, in particular, the well-organized system of forest conservation. The natives of Java, moreover, have adopted since very remote times, an excellent system of terracing in their rice fields. This does not mean, however, that the effects of erosion are unknown in the Netherlands Indies. Torrential rains easily cause gully formation, even after only a day's rain. Possibly the very intensity of these heavy rains has suggested to both the Dutch colonizers and the natives the effective protection measures which they adopt.

The above examples chosen rather arbitrarily have been given in order to show the world-wide importance of soil conservation and also to point out the different aspects of the problem in the different parts of the globe. Attention will now be given to the sources of information available; the different aspects of the problem will be treated, and the possibilities of international collaboration in the fight against soil erosion and deterioration studied.

Sources of information.

Before anyone can fully realize the importance of soil conservation, he must see the effect of erosion for himself. However well-written, descriptions cannot take the place of direct observation in any given region of which the agricultural history is known. Only after having seen the effects of erosion, and studied control measures in some particular area, is it possible for anyone to understand, from the study of publications, the problems of other regions which have not been visited. It would be of considerable value, therefore, when communications between the different countries return to normal, to organize international tours during which the officers of soil conservation services would exchange opinions on concrete cases.

There are no publications for the countries where the inhabitants from time immemorial have realized the necessity of conserving the soil and where erosion only plays an accessory part. Many of the measures now adopted in new countries have always been in force in the countries of Northern and Western Europe; forest protection, river control, measures against avalanches and many others, are part of the traditions of the agricultural populations, without any need being felt for publications promoting the use of erosion measures.

Without wishing to give a complete bibliography, mention of some important publications on the question, issued in the last few years will be of interest.

The number of publications in English is considerable; in fact, it is chiefly in America and in the British Empire that the dangers to which recently colonized

regions are exposed, are realized. One of the most important publications is 'The rape of the earth' by V. G. JACKS and R. O. WHYTE, issued in 1939 (a review of this book was given in the December, 1939 number of this Bulletin). This book is the sole attempt, up to the present, at treating erosion as a phenomenon which concerns the whole world. It is evident that it was impossible for the authors to deal with all regions with the same attention and detail, but it is to be appreciated that there is now a publication available in which the same importance is attached to economic and social forces as to the forces of nature.

No sources of information are cited in this work of Jack and Whyte; these are given in a bulletin by the same authors published in 1938, entitled 'Erosion and soil conservation.' In this bulletin, the different countries where the problem of erosion has been studied up to the present, are reviewed, and a fairly complete bibliography is also given.

Next is an article of Sir FRANK STOCKDALE. The author examines the situation in the countries of the British Empire, most of which he has visited personally.

A. W. F. JOACHIM has collected in an article the legislative measures taken in the different countries, a useful work, as these measures have been inspired by widely differing motives.

Turning to the American bibliography, it is seen that the number of publications issued in recent years is considerable. There is also a review 'Soil Conservation' which is now in its sixth volume. The articles are of high scientific value and written in popular language; the photographic illustrations are excellent.

Among important publications, mention may be made of the 1938 Year-book of the United States Department of Agriculture, called 'Soils and men.' The most eminent specialists of the United States have collaborated in the preparation of this volume of over 1000 pages. The book is divided into five parts: the nation and the soil, the farmer and the soil, soil and plant relationships, fundamentals of soil science, soils of the United States. The object of the Department of Agriculture in publishing this volume was to co-ordinate the knowledge acquired and the experiments made in the United States. The value of this volume lies in its completeness and in its presentation, to a greater extent than the works published in England, of the different aspects of the problem: loss in soil fertility is not attributed exclusively to erosion, other possible adverse factors are also taken into account.

In 1939, the Chief of the Soil Conservation Service, HUGH HAMMOND BENNETT, wrote a book entitled 'Soil conservation.' Although concentrating chiefly on the position in the United States, the author has endeavoured, in a few chapters, to treat erosion as a world-wide problem and to ascertain the relationships between increase in soil erosion and the fall of ancient civilizations. This volume comprises a complete documentation on erosion in the United States and also on soil conservation measures.

Attention may also be called to the numerous brochures and books in popular form published in the States including some of literary importance, such

as 'Rich land, poor land' by STUART CHASE. The author's aim was to examine a problem greater than that of soil conservation, namely, that of the loss in the natural wealth of the North American continent. He also treats on the exhaustion of the mineral resources; this subject, however, does not come within the scope of this article. But the problem of the forces of water, ungoverned or badly governed, is the main subject of this book; the author studies its different aspects, from forest and grassland management to erosion control measures and the regulating of rivers. One of the most interesting chapters is that on the TVA (Tennessee Valley Authority) in which the author gives the history of this vast restoration work.

Other works of a similar type are those of AYERS BRINSER (Our use of the land) and RUSSELL LORD (Behold our land).

Other books of a technical nature are those in which detailed information on conservation measures is the main theme, for example, the work of A. F. GUSTAFSON (Conservation of the soil) or that of Q. C. AYRES (Soil erosion and its control). The Italian work 'La difesa del suolo negli Stati Uniti di America' by A. Alfari, is on the same lines.

Soil conservation is included in the programme of integral land reclamation in Italy. The number of publications on the subject is considerable. The most complete information, however, will be found in the volumes of the 'Biblioteca della Bonifica integrale'. Other more abridged works are also available, for example, the recent book of G. TASSINARI, published in German, French and English, entitled 'Ten years of land reclamation under the Mussolini Act' and the publication 'Land reclamation in Italy' by C. LONGOBARDI.

Different aspects of the problem of soil deterioration and conservation.

This chapter is divided into three sections: (1) problems; (2) causes of decline in fertility or soil losses; (3) measures required.

Problems. — The chief problem may be defined in the two words the U. S. Department of Agriculture chose as title of the 1938 Yearbook: 'Soils and men'. The problem is serious when the equilibrium between the two is upset, either because man has neglected to take the precautions necessary to maintain soil fertility, or because various circumstances no longer permit him to live on the products of the soil.

As has been seen, not only do the questions to be solved differ from country to country but also from one district to another in the same country.

In the United States, for example, the following questions are distinguished: In humid regions—improvement of lands unsuitable for cultivation owing to careless and excessive clearing; in the sub-humid regions—excessive optimism founded on the results of a few favourable years, and erroneous adaptation of European methods (successful farms are to be found in the dry farming regions, but at the same time, cultivation is too intensive, especially the practice of very deep ploughing which exposes the soil to wind); in the extensive grassland areas—overgrazing and grazing during seasons when the land should

be rested to enable renewal of the grass cover; lastly, in different regions—faulty irrigation and drainage.

Naturally, it is impossible in this article to examine the regional problems of other countries.

Causes of decline in fertility or soil losses.—In our opinion, water and wind should not be considered the sole causes of soil deterioration. For a complete study, other factors have to be included. The soil scientists engaged in the study of tropical soils, particularly P. VAGELER, have shown the tremendous influence of high temperatures and tropical rains on the mechanical disintegration of soils, which is accomplished infinitely more rapidly than in temperate countries.

Distinction should be made between the direct and indirect causes. Thus, erosion should be considered as a direct cause, often itself brought about through indirect causes (soil denuded of vegetation, faulty ploughing, cultivation on very steep slopes without using protective measures, etc.).

Without attempting to be complete, it is now proposed to examine some of these direct and indirect causes.

(A) **Erosion by water.**—To-day, most scientists distinguish two or three types of erosion by water:

(i) Sheet erosion—the soil is detached from the sub-soil stratum in more or less consistent layers. In some cases, sheet erosion is inconspicuous. To determine its action exactly, regular observations carried out with apparatus for measuring the total quantity of arable soil removed during a rainy period, are necessary.

(ii) Gully erosion—formation of ravines or gullies. These gullies begin as small grooves which deepen and widen with each fresh fall of rain. In the humid tropical areas, sometimes a day's rain is sufficient to cause quite deep incisions.

(iii) Rill erosion—expression used by American scientists to indicate the erosion which results when run-off water concentrates in numerous streamlets over the surface of the soil and of sufficient volume and velocity to form grooves of varying depth in the land.

It is evident that these three types of erosion may sometimes occur together and that there are transitions between the different types.

Soils vary in susceptibility to erosion. Some are very erodable; with others, the contrary is the case; the former have generally been reduced to this condition through the interference of man. In fact, there are few soil types of which the structure itself facilitates erosion, the majority having been destroyed in the course of centuries. The vegetal cover, trees and shrubs in the forests, gramineous and herbaceous plants on the grasslands, protected the soil until man interfered. As regards their susceptibility to erosion, after being opened up for cultivation, a distinction is observed between the soils formed by conifer forests, those under gramineous and herbaceous plants, and those of deciduous tree forests. The soils of tropical forests merit treating separately.

What are the indirect causes of water erosion? The most important is certainly soil denudation. At first, the cause was attributed to the deforestation of mountain slopes, but later it was found that even on bare soil a slight inclination was sufficient to cause the removal of the surface layers. In fact, numerous comparative experiments carried out under very diverse conditions, have proved the close relation between the quantity of soil removed and the intensity of plant cover.

The disappearance of the grass cover through overgrazing is another indirect cause.

There is also the effect of untimely and incompetent ploughing carried out with regard to the relief of the soil; the vertical furrows represent as many starting points of erosion. In hot countries, mechanical ploughing, especially where there is a tendency to make excessively deep furrows, is a danger to which too little attention has been paid.

The causes mentioned are the result of a want of proper forest protection, legislative measures usually being inadequate, or of the negligence of the farmer due to absence of system in farming, and knowledge of the local edaphic and meteorological conditions. In many instances, also, farmers in a new country are not disposed to invest in their farms the capital necessary for erosion control. Their concept is that, when crop yields begin to diminish, fresh arable land is easily found. The farmer is not permanently settled and is content with a series of good harvests to later acquire fresh land. It is not only among the so-called primitive peoples of Africa and Asia that shifting cultivation is encountered; it has also played an important and disastrous rôle in the conquest of the American continent. In other cases, the desire to conserve the soil exists, but the poverty of the farmers, often due to the low price obtained for their agricultural products, is the true source of the evil.

These facts demonstrate the complexity of the problem of water erosion which, at first view, appears simple. It is evident, therefore, that control cannot be successfully achieved through the individual efforts of the farmers, but must be effected under the supervision of the local and if necessary government authorities. Moreover, collaboration between the different government, forestry and agricultural services is essential.

(B) Wind erosion. — In many countries, wind erosion is as important as water erosion. The two types may be combined. Soil which has been leached by water is easily damaged by wind.

A distinction should be drawn between the two phenomena: (i) deserts, meaning those areas bare of vegetation which have existed in this state since time immemorial; (ii) deserts and semi-deserts recently created by man.

(i) Documentation on the encroachment of the Sahara is copious. The scientists who have studied the subject have often expressed contradictory opinions. It is not known, after all, whether the fluctuations in its extent are caused by climatic fluctuations or by man creating conditions at its southern limits which favour extension. Considerable efforts have been made recently in North Africa to check the advance of the desert by different methods of stabilizing the

dunes. It is also reported that overgrazing is the chief factor which facilitates the extension of desert land.

(ii) It is from the man-made deserts in the States of Texas, Oklahoma, Kansas and Colorado that the famous dust storms which have caused so much discussion in recent years, originated. It seems that dry farming is the basic cause of this wind erosion. The plant cover was destroyed by the plough; the system of dry farming consists of a regular succession of wheat and clean fallow, that is, the land was systematically denuded of all vegetation in order to maintain the humidity and nitrogen of the soil. This practice decidedly facilitated the removal of the fine soil particles by wind and it has been recently found that it is these very fine particles which contain the highest percentage of organic matter, nitrogen and phosphorus, while the real sand, composed of heavier particles and deposited in the form of dunes at a lesser distance, is considerably poorer in nutritive elements.

Account should also be taken of the different types of soil more or less susceptible to aeolian removal. In future, in the arid regions, an endeavour should be made to reconcile the need of the farmer to maintain the maximum amount of humidity and nitrogen in the soil—clean fallow appears to be the only system which is really efficacious—and the necessity of conserving the soil.

(C) Other causes of soil deterioration.—The question of soil conservation cannot be limited to the effects of erosion. It has been found that the content of the soil in nutritive elements, organic and mineral, practically always decreases during the years following forest or grassland clearing.

This is particularly true in the case of tropical and subtropical countries. In the virgin forests of the tropics, almost all the nutritive matter is fixed by the exuberant vegetation and is only returned to the soil, by decomposition of dead leaves and stalks, to be immediately re-absorbed in plant growth. The soil, therefore, serves primarily for the fixation of the roots and only secondarily as a transient reservoir of nutritive elements. In general, the native farmers have intuitively understood that the so-called fertility of forest soils is often fallacious. They have instinctively practised shifting cultivation, a system known under various names in almost all tropical countries. Small plots are cleared in the forest for the cultivation of food crops, and occasionally even industrial plants (coffee, tobacco and others). These plots were abandoned before the soil had lost all its natural fertility, to enable the regeneration of secondary forest growth; other plots, either virgin land or formerly cultivated areas were then cleared. This system is not, as is often thought, a danger in itself. In general, the fertility of soil is sufficient, although it decreases slightly with each new clearing, to support a primitive people; on the condition that its number does not become excessive. On the other hand, this system becomes highly dangerous if the natives are obliged to remain too long on the same areas, owing to too rapid an increase in number, or to the immigration of other tribes. Soil fertility falls to a level which can no longer support a sufficiently dense secondary forest growth.

The same retrogression occurs when the virgin forest is replaced by permanent plantations of shrub crops: tea, coffee, cacao, hevea and others, particularly if no attempt is made to return to the soil the organic and mineral matter removed by the crops, and if the leaching of these elements is not reduced to a minimum (fertilizers, terracing, green manure and cover plants, etc.).

The same remarks apply to grassland soil used for cultivation. The American pedologist JENNY compared the content in organic matter of a virgin grassland soil with that of fields cultivated for sixty years, using a rotation of maize, wheat and barley. While no leaching was observed, JENNY found that the cultivated soils had lost 38 per cent. of their organic matter during this period.

The restoration of the fertility of soils thus exhausted is mainly a question of propaganda and social order. Agricultural science, has in fact, shown the possibility of restoring fertility by means of suitable fertilizers; but there is some difficulty in carrying out the methods recommended, due either to the ignorance of the farmers or to insufficient financial means.

Thus in India the insufficiency of manure is one of the greatest hindrances in agriculture. In this country where farm animals abound, there is no shortage of manure, but owing to the high price of other fuels, the dried manure is generally adopted for this purpose. Formerly, the method of making compost by mixing manure with plant waste and animal urine, was practically unknown. It is only recently that an attempt has been made, by propaganda from model farms, to popularize the use of compost. The use of green manure plants is better known, but far from being general.

The above remarks on India also apply, *mutatis mutandis*, to many other tropical countries, particularly the African countries where any care in cultivation methods has only been undertaken within the last few decades.

(D) Soil deterioration due to faulty irrigation and drainage. — The practice of irrigation dates back to the early beginnings of civilization. The civilizations of ancient Assyria, Egypt and also Southern China were based on the art of irrigation. Even to-day, part of these regions are still irrigated, without the fields, during the many centuries, having shown any decrease in fertility.

On the other hand, it is to be regretted that, in the present day, faulty irrigation in some cases has brought about disastrous results. The crop yields, excellent at first, gradually decreased until the soil showed signs of complete exhaustion.

It is now known this state is caused by the accumulation of alkaline salts in the sub-soil. The salts dissolved in the irrigation water, chiefly those containing chlorine, sulphur and sodium may exercise a harmful influence on the crops, an influence which does not become apparent until after a lapse of time more or less long, during which they have accumulated in the soil. These unsuccessful experiments showed that a careful study of the chemical composition of the irrigation water and also of the soil should be made before constructing irriga-

tion works. It was concluded that a good drainage was the best corrective for the harmful effects of irrigation. For irrigation land, it is also necessary to select soils, the composition of which promises high and lasting yields.

(E) Causes of an economic and social order. — It has been shown that economic and social factors have an indirect influence on soil deterioration. Some examples may be of interest.

In this respect, problems of land tenure may be cited. History shows that large estates have frequently been the basic cause of soil exhaustion and decreased yields. This is particularly the case when the estate owners do not reside on their property. However, generalization should be avoided. There are many instances in which the development of uncultivated land is only possible by means of a large capital and the certainty of being able to start a new crop on a large scale (plantations of caoutchouc, sisal, tea, etc.).

The poverty and running into debt of small holders may lead to the same results, when want of capital prevents them using every precaution in cultivation and taking erosion control measures.

The problem of shifting cultivation has already been mentioned in the previous chapter.

Overgrazing, which is decidedly one of the chief causes of soil deterioration, merits a more detailed study. In general, it is the result of an excessive increase in the herds which become too numerous for the rational utilization of the existing grasslands. This phenomenon often takes place in new countries where the general impression is that the grassland available is unlimited. The irrational increase in the live-stock of many African tribes is due to the fact that cattle are valued not for their meat, milk or for draught purposes, but solely as a symbol of wealth, thus acting as a substitute for money. Attempts have been made to instil more rational ideas.

Control measures. — It is impossible to treat on all control measures in this article. Mention will only be made of some of the methods generally adopted in the United States and recommended by the Soil Conservation Service.

It is seen that agricultural technique is far enough advanced to enable the rural population to protect its land against the dangers of erosion. At present, it is mainly a question of finding the means to carry out the improvements proposed by the agricultural technicians. Successful control also depends on the collaboration of the farmers in the affected regions, first among themselves and then with the Government Services. This collaboration has attained a very high degree of efficiency in the case of large-scale operations carried out in the United States, such as the TVA project.

The best method of checking the effects of soil exhaustion and deterioration, is to make these effects known to as many of the people as possible. Demonstrations *in situ* are the best means of instructing the farmers; they could be substituted by lectures with lantern-slides. Publicity such as envisaged in the United States with the many well-illustrated pamphlets written in popular language, is of immense value.

The principal control measures employed are: establishment of cover plants, protection of wild plants which act as a cover, forest management, planting of windbreaks, contouring, terracing, strip cropping, suitable rotations, gully stabilization, gully prevention by regulated drainage of terraces, control of flooding.

It has been found that some of these measures applied chiefly in the United States such as contouring, and strip cropping have been highly successful. Elsewhere, they are little known, with the exception of South Africa where they are frequently employed. In later articles, it is proposed to return to this question in greater detail and, for the moment, the reader is referred to the publications cited above.

International collaboration.

The conservation of arable land is a problem which concerns all mankind. It is important, therefore, that the efforts made in the different countries should be co-ordinated, and that an international publicity should encourage all works of consequence, the purpose of which is to make known effective measures against erosion and other dangers.

Realizing the importance of soil conservation, the XVth General Assembly of the International Institute of Agriculture, after having taken cognizance of an interesting report presented by Signor A. MAUGINI, Delegate of the Italian Colonies at the Permanent Committee, adopted the following Resolution:

'The General Assembly invites the International Institute of Agriculture to establish a close collaboration with the International Soil Association in the field of soil conservation, and also to include in its activities on this question, the temperate countries'.

Thus the Institute is faced with a new task. Firstly, it is necessary to determine what direction this activity should take, at the same time taking into account that the present moment is not suitable for new international undertakings. This does not prevent us, however, from determining the general lines to be followed in the future. With this purpose in view, the Delegate of the United States indicated the following as the main subjects for study:—

I. — Survey of land-use, past and present as it relates to soil conservation.

II. — Outstanding problems in soil conservation disclosed by the survey.

III. — Suggestive projects of study to profit by the experience of the past and by the science and technology of the present and the future.

The fundamental idea of the memorandum of the Delegate of the United States would appear to be the establishment of a world census of soils, according to the following criteria:—

- (1) cultivated areas capable of being maintained under present conditions of cultivation;
- (2) soils in deterioration or threatened by same;
- (3) semi-desert areas which were cultivated up to comparatively recently;
- (4) areas suitable for agricultural purposes: forests and grasslands: (a) with irrigation; (b) after irrigation.

The object of this census would be to make all countries of the world soil-conscious. It is of primary importance to know if all the agricultural soils available are cultivated so that fertility may be maintained as long as possible. The so-called pressure of agricultural peoples who seek new horizons, often is nothing but the abandonment of their native soil, destroyed by ruinous methods of cultivation. An emigration of farmers from regions having a sound agricultural tradition, on the other hand, would be highly fortunate for new countries.

It would also be interesting to ascertain the possibilities of recolonizing formerly ruined regions, such as the majority of the mountainous regions of the Mediterranean.

All these enquiries necessitate careful preparation. At the same time, however, excessive exactitude should be avoided. The registration of the soils in the first or second category will always depend on a more or less subjective estimation. Account will also have to be taken of the attitude of the government organizations to which will be entrusted the completion of the questionnaires and which may, perhaps, sometimes be inclined to sacrifice frankness to national pride, and thus not giving an entirely exact position.

For still further reasons, it is premature to begin any enquiry on soil conservation, mainly because there is a want of uniformity as to the exact meaning of the terms, erosion, deterioration, exhaustion, etc. The first object of our work would consist in popularizing the knowledge acquired in the different centres engaged in soil problems, described earlier on in the text, and in obtaining the collaboration of eminent soil scientists with a view to preparing a popular work on the question. To this end, an attempt was already made, before hostilities began, to bring together several well-known specialists who agreed to collaborate in the compilation of an international symposium. The outbreak of war prevented this initiative being continued.

Only after the popularization and dissemination of the present knowledge available, will it be possible to begin preparation of the census in question.

The questions to be put should be established by an International Congress on soil conservation, convened by the International Institute of Agriculture and the International Soil Conservation. The collaboration between these two organizations could be arranged in such a way that the International Soil Association, organization of soil scientists, undertakes the purely scientific problems, while the International Institute of Agriculture assembles the information and, at the same time, deals with the social problems which are also important in soil conservation.

This is only a general outline of a programme which must necessarily be postponed until times are normal. It has not been presumed, therefore, at the present moment, to request the assistance of the different Departments of Agriculture, nor that of the specialists engaged in soil science, for contributions to the above-mentioned symposium. Contributions from anyone engaged in soil conservation work, however, will be gratefully accepted, provided that they are written in popular form, and that they contain the results of personal experiences. Any suggestions regarding the proposed enquiry will also be welcomed.

Finally, the execution of this programme necessitates pecuniary resources, of which the International Institute does not dispose. This, however, is the least difficulty. No one who has not lost all faith in the sound evolution of mankind, can doubt that the necessary means will be found for an international undertaking which aims at constructing and establishing a well-founded basis for future generations of agriculturists.

W. BALLY

Publications consulted:—

- ALFANI, A. La difesa del suolo negli Stati Uniti. — Firenze, R. Istituto Agronomico per l'Africa Italiana, 1939, 344 pp.
- AYRES, Q. S. Soil erosion and its control. — New York and London, McGraw-Hill Book Company, Inc., 1936, 365 pp.
- BENNETT, H. H. Soil conservation. — London, McGraw-Hill Publishing Company, Ltd., 1939, 933 pp.
- BIBLIOTECA DELLA BONIFICA INTEGRALE (further volumes are to be published). — Firenze, S. A. G. Barbera, Editore.
- BRINSER, A. and SHEPARD, W. Our use of the land. — New York and London, Harter and Brothers, 1939, 303 pp.
- CHASE, S. Rich land, poor land. A study of waste in the natural resources of America. — New York and London, Whittlesey House, 1936, 361 pp.
- DELEGATE OF THE UNITED STATES OF AMERICA. A memorandum on soil conservation as an international problem in land use. — *Reports submitted at the XVth General Assembly of the International Institute of Agriculture*. Appendix to No. 6, Rome, 1940, 2 pp.
- GUSTAFSON, A. F. Conservation of the soil. — New York and London, McGraw-Hill Book Company, Inc., 1937, 365 pp.
- JACKS, G. V. and WHYTE, R. O. Erosion and soil conservation. — *Bulletins of the Herbage Publications Series*, No. 25, also published as *Technical Communications from the Imperial Bureau of Soil Science*, No. 36. Aberystwyth and Harpenden, 1938, 206 pp.
- JACKS, G. V. and WHYTE, R. O. The rape of the earth. A world survey of soil conservation. — London, Faber and Faber, Ltd., 1939, 313 pp.
- JOACHIM, A. W. R. Summary of legislation or other governmental action on soil conservation in various countries. — *The Tropical Agriculturist*, Peradeniya, 1939, Vol. XVCII, No. 4, pp. 224-233.
- LONGOBARDI, C. Land reclamation in Italy. Rural revival in the building of a nation. — London, P. S. King & Son, Ltd. 1936, 243 pp.
- LORD, R. Behold our land. — Boston, Houghton Mifflin Company, 1938, 310 pp.
- MAUGINI, A. La conservation des terrains, avec référence particulière aux pays tropicaux et subtropicaux. — *Rapports présentés à la XV^{ème} Assemblée Générale de l'Institut International d'Agriculture*, n° 6, Rome, 1940, 6 pp.
- STOCKDALE, Sir F. Soil erosion in the Colonial Empire. — *The Empire Journal of Experimental Agriculture*, Oxford, 1937, Vol. V, No. 20, pp. 281-297.
- TASSINARI, G. La bonification intégrale dix ans après la loi Mussolini. — Faenza, Lega Frères Editeurs, 1939, 172 pp.
- VAGELER, P. Grundriss der tropischen und subtropischen Bodenkunde. Zweite Auflage. Berlin, Verlagsgesellschaft für Ackerbau, M. B. H., 1938, 253 pp.
- Soils and Men-Yearbook of Agriculture. United States Department of Agriculture, 1938. — Washington, 1939, 1932 pp.

PROBLEM OF MALNUTRITION AS REGARDS THE RURAL POPULATIONS OF EUROPE

Defective nutrition leads more or less rapidly to disease and degeneracy among rural populations. Improvement in nutrition is essential to agricultural progress and is the strongest force militating towards improvement in health and in the yield obtained from labour. The establishment of rational dietary systems requires that studies be made in nutritive typology. Numerous methods and measures tending towards improvement in nutrition have been adopted in various countries, but these have been insufficient in the case of the rural population. The solution of this problem of primary importance will call for a tremendous united effort on the part of all agricultural institutions.

Introduction.

Among the problems relating to human nutrition, that of underfeeding of the rural populations, and especially the poorer classes, will be of primary importance after the war.

The improvement of the diet of rural workers, an essential condition to agricultural progress, may have extensive repercussions on output; alteration in the diet of masses of peasants in various countries may have far-reaching effects on the world market for the principal foodstuffs and if its evolution is stimulated in any given direction an increase in the demand for various foodstuffs may result. An improvement in the diet of the poorest rural classes will increase the yield of labour, as an ill-nourished man works badly and cannot improve his food as he does not earn enough.

A rational modification of the dietary system in accordance with the requirements of living and work will have a wide influence on agriculture in every country. It is obvious that in the most backward agricultural countries where poverty and want are common conditions, the objective will be to guarantee sufficient food for the inhabitants rather than an 'ideal' diet.

Preliminary studies.

Any undertaking which aims at the improvement of the diet of the rural masses is very complicated, while the measures adopted vary in relation to the conditions ruling in each country.

The solution should be approached from the practical standpoint and with the combined efforts of international action.

Nutrition studies present several difficulties, two of which are of outstanding importance:

- (1) determination of the present situation;
- (2) application of modern physiological and biochemical data.

A study of nutrition conditions resulting from the world war calls for accurate statistical data, which should be as clear as possible, concerning output, consumption among the farming classes and the price of foodstuffs.

Questions of dietary physiology are always very delicate; the evolution of the sciences relating to nutrition and diet is becoming increasingly rapid. The progress made in knowledge concerning matters of diet make it possible at the present time to understand and remedy numerous conditions of malnutrition which in former times were not recognized. It is therefore highly important that the diet of the rural classes should be the object of systematic and periodic study.

A detailed study of the physiological bases of the diet of the rural population calls for:

(a) the determination of their requirements in energizing elements; (b) the determination of their requirements in non-energizing elements; fundamental food substances which are specifically indispensable (amino-acids, mineral substances, vitamins and roughage); (c) the determination of a dietary balance suited to each physiological case considered; (d) the study of the minimum and optimum food requirements of farm workers (different categories); (e) the study of the special requirements of pregnant women or nursing mothers belonging to the peasant classes; (f) the study of the requirements of children.

The practical application of various scientific ideas should be preceded by numerous complementary and detailed studies of dietary habits.

It is equally important to have detailed and accurate knowledge of the chemical composition and biological value of all foods. Control of the nutritive value of foodstuffs and the suppression of fraud in this field should form the object of international agreements.

Owing to the extreme importance of the food problem from the standpoint of hygiene and agriculture, the chief international organizations, such as the Hygiene Section of the League of Nations and the International Labour Office have for some years made a special study of the extent to which the various countries suffer from malnutrition.

In the first place, the International Labour Office took the question up from its social aspect; later, the League of Nations appointed a Joint Committee to make a further study of the matter and invited the International Institute of Agriculture to take an interest and collaborate in the work.

In May, 1936, the International Labour Office published a report entitled 'Workers' diet and social policy' and containing records of family budgets.

In connection with its work of protecting the interests of agricultural production, the International Institute of Agriculture continued the study and in 1937 published a first report dealing with one of the questions dealt with by the Joint Committee for the nutrition problem. This report, compiled by the Bureau of Economic and Social Studies was entitled 'Investigations into the margin between producers' and consumers' prices of certain foodstuffs'.

Obviously the consumption of a peasant family depends on the size of its total income; when this falls below a certain minimum, the family cannot always reduce its consumption in the same proportion. Adjustment to a decline in

income is not made immediately, but takes place after a certain interval. This is proved by a special study of variations in the farmer's income which has special characteristics in certain countries.

A study of the standard of living on small farms should not consist of examining the consumption expenses on the various farms distributed to area (*e. g.*, under 2 hectares, from 2 to 3 hectares, from 3 to 5 $\frac{1}{2}$ hectares); classification should be made according to total income. This method is justified by the fact that the smallest landowners have a higher total income if they obtain additional profits, and they are therefore able to spend much more on food than farmers operating on a larger scale who nevertheless have no other sources of income. There are certain countries, however, where well-off peasant families (cultivating from 50 to 100 hectares), sell all the produce of their farm on the market and live for the most part on bread, potatoes and cabbage.

A study of the characteristics of the standard of living, offering the possibility of making comparisons is therefore necessary; it has been suggested using the percentage of profits spent for food as an index; generally speaking, it may be said that peasants have a very poor diet, their standard of living nearly everywhere is inadequate and lower than the average in their country and this has an adverse influence on their physical health, intelligence and working ability; it is equally dangerous in its effects on the demographic evolution of each country. An ill-nourished peasant is barely able to do part of a normal man's work; better nourishment would enable him to make a more prolonged and steadier effort and to avoid the reproach of laziness which is often made against farmers in certain regions.

As a rule there is too little variety in the peasant's diet, it is monotonous and deficient, poor in protein, mineral salts and vitamins. The main question is to abolish underfeeding and malnutrition and to prevent shortage. Young children especially are under-nourished, while adults lose from 10 to 15 per cent. of their weight during heavy field work.

Generally speaking, it is for economic reasons that the poorer country dwellers fail to consume enough meat, milk, cheese and eggs, which are considered almost as luxuries. When ignorance concerning a rational diet is added, very marked underfeeding is observed in nearly every poor agricultural region. Underfeeding and malnutrition are social and agricultural problems throughout the whole world.

It is useless, however, to seek to establish a strictly rational system, a « standard » for every period of peasant life and during the various seasons, because other factors besides physiological knowledge must be taken into consideration, one of the chief of these being the cost price of foodstuffs. The diet of the rural population in every country has characteristics which differ greatly from those of town dwellers. The diet of the peasant masses differs greatly during the various seasons of the year in every geographical region in Europe. The greatest food shortage occurs in spring; rural diet is characterized by a certain abundance after harvesting and scarcity during the preceding period.

A rational human diet is, generally, speaking, very much the same everywhere. The output of energy must be replaced in a large measure by foods rich in glucides (cereals, potatoes and possibly legumes); a certain proportion of milk

and meat is used to raise the protein content. Lastly, certain proportions of fresh fruits and raw vegetables – providing vitamins and mineral salts – must be consumed in order to supply all the elements necessary to the life and health of the individual.

The diet of the rural population should contain a quantity of the foods which are indispensable to replace the output of energy of every description. Unfortunately the other requirements are very rarely satisfied.

The latest suggestions made by the Technical Nutrition Commission of the League of Nations are as follows; for muscular activity the following supplements should be added to the «basic» diet:

| | | | | |
|-----------------------------|----------------|---------------------------|---|---|
| light muscular work | up to 75 | calories per working hour | | |
| average muscular work . . | » 75-150 | » | » | » |
| intense muscular work . . | » 150-300 | » | » | » |
| very intense muscular work | » 300 and more | » | » | » |

The muscular activity of children of both sexes between the ages of 5 and 11 is equivalent to light work; that of boys from 11 to 15 years is equivalent to moderate work, while that of girls from 11 to 15 years and over is equivalent to light work.

Naturally, energy requirements vary considerably from one country to another – and even in one single country – as the result of the influence of various factors: difference in the length of the working day, activity of the individual, average height, environmental conditions (climate, etc.). The above figures are, however, necessary to establish a comparative scale.

Using statistics on the total production of a country and the demand on the food market as a basis, the annual consumption per capita of the inhabitants may be calculated for the principal foodstuffs.

With the help of the studies made by the League of Nations and the International Institute of Agriculture, an approximate figure may be reached for the minimum energizing value in calories of the foods consumed daily per person. The «basis» has been fixed at 2400 calories adding a supplement of 150 calories per working hour for those engaged in very intense work. Since field work lasts ten hours in the summer, the supplement should be about 1500 calories; consequently the energy-producing foods in the daily diet should contain some 4000 calories, and in any case not less than 3500 calories.

Energy-producing principles belong to three categories of organic substances chemically different: the first category includes starches, feculas, sugars, (glucides); the second includes fats and oils (lipides); the third, nitrogenous substances: albumins, albuminoids, proteinic substances or proteins, classified in the large group of protides.

From the quantitative point of view, the energy-producing elements constitute the greater part of the diet. The quantity should obviously be increased when the organism supplies mechanical work, when it has to fight against external cold, during the periods of growth, pregnancy, nursing, etc.

The part played by protein foods is both energy-producing and specific; their food value, therefore, differs essentially according to the manner in which these substances are used.

When considered exclusively from the point of view of output of heat, which is measured in calories, the three dietary potentials are interchangeable; the one may replace the other in the proportion of its calorific value, in accordance with the isodynamic principle. Practically speaking, however, it is impossible to eliminate entirely one of the three categories of substances, by replacing it with suitable quantities of the other two. A minimum of each of the three must be included in the diet. This minimum is very low in the case of lipides and glucides, but is not nearly so low for proteins.

When compared with the enormous mass of energy-producing substances, the need for non-energizing elements is minimum. The question of quantity yields place to that of chemical constitution and to the question of quality. This is exactly the case for certain nitrogenous substances. The deep significance of the minimum requirement of nitrogen should be emphasized; it is most important that the food proteins consumed should include all the indispensable amino-acids in suitable proportions. But this rarely happens in nature. Certain proteins are completely lacking in one or several of the necessary amino-acids. The best proteins from the particular standpoint of amino-acids are as a rule those of animal origin; vegetal proteins have generally speaking, a lower nutritive value because certain amino-acids, which differ from one food to another, are found in more or less insufficient quantities. Only a judicious choice of these vegetal proteins, necessarily varied and consumed in relatively large quantities, would enable the organism to obtain all the organic substances necessary to life in adequate form.

The chief part played by fats is due mainly to the fact that they serve as reserve material and supply the system with liposoluble vitamins. Some mineral substances must enter the system in fairly large quantities; others are only necessary in comparatively small or very small quantities. Some foods contain large quantities of minerals; others are rich in certain elements and poor in others; cereals for instance, are rich in phosphorus, but poor in calcium and sodium; milk is rich in sodium but very poor in iron; meats are rich in phosphorus but poor in calcium and magnesium, etc.

There remains another category of elements which the system, with rare exceptions) is incapable of synthesizing itself and which the food itself must supply regularly; these are vitamins.

The lack of vitamins or previtamins in the diet leads to several characteristics diseases, as follows: Avitaminoses: A avitaminosis — xerophthalmia, keratomalacia, hemeralopia; B₁ avitaminosis — beriberi; C avitaminosis — scurvy; B₂ avitaminosis — pellagra, certain forms of dermatitis and anaemia; D avitaminosis — rachitis; E avitaminosis, etc.

General disorders during the period of growth (B₂, A, C), certain forms of anaemia (A, C), anomalies of dentition (A, D, C), all belong to the category of well-defined avitaminosis or vitamin deficiency.

Besides those diseases due to pronounced unbalanced conditions there is a series of small disturbances which are not clearly defined: more or less unnoticeable deficiency symptoms, latent previtaminosis or hypovitaminosis difficult to diagnose due to their special character leading to: scurvy, (pre-scurvy) beriberi, pellagra, denutrition, dental caries, decalcification, etc.

These diseases are generally due to a combination of several forms of disequilibrium added to underfeeding, resulting from insufficient calories.

Methods for estimating the state of nutrition.

When studying underfeeding in the individuals of certain groups, the quantitative and qualitative states of malnutrition must be defined.

At the present time there is a combination of methods and technical processes constituting a new science highly developed; this is called *biotypology*, and it fulfills both scientific and practical requirements. Studies which enable the research worker to define the conditions of malnutrition are essentially forms of biotypological research. The difficulty of this form of research work is due to the fact that it is essentially a subject for collective work while, in many countries, the organization of scientific research has been founded on a basis of absolute individualism. Moreover, the results obtained from groups in a state of underfeeding must be set against the normal groups best suited for comparison.

International institutions have a definite rôle to fill in the pursuit and progress of the research work required in this field.

Physiological tests:

(1) Specifics of deficient nutrition; (2) non-specifics of deficient nutrition, based on functional tests indirectly influenced by faulty nutrition.

An inadequate supply of most of the constituents of diet may lead to specific disturbances, such as defects in the growth and calcification of the bones, in the formation of the respiratory pigments, in the progress of the growth of young organisms, in the co-ordination of metabolism, etc.

Simultaneously with the specific characteristics, the precocity of the signs of latent deficiency must also be contemplated for reasons of a practical nature.

The early signs of deficiency are:

(1) symptoms of latent vitamin deficiency; (2) symptoms of mineral deficiency; (3) symptoms of protein deficiency.

In certain countries where underfeeding and the lack of balance in diet are very marked, well-defined and extensive avitaminoses are very frequent.

Latent deficiency in vitamins or hypovitaminosis has only recently been recognized. It consists in a dissociation in two successive phases of the evolution of avitaminoses: (1) a period of inapparent hypovitaminosis; (2) a period of more pronounced and apparent deficiency.

The idea of latent deficiency was not discovered for a long time. Up to the present the only form of early diagnosis of latent vitamin deficiency which can be made is in the case of a partial shortage of the vitamins A, B, B₁ and C.

The GÖRHLIN method (capillary resistance test) is used to determine any deficiency of vitamin C and also the haemoglobin content of the blood. The diagnosis of a deficiency in vitamin A is diagnosed when hemeralopia, is found. The discovery of vitamins A and C in the blood is an important means of diagnosing faulty or insufficient nutrition.

When the specific characteristics of defective nutrition are sought, the methods for estimating nutrition conditions are never simple. In the future the progress of knowledge concerning states of underfeeding will depend upon exhaustive surveys carried out over a comparatively restricted number of subjects and offering indispensable supplementary information on the question. It will therefore be necessary in many cases to combine surveys on alimentation with other surveys concerning the state of nutrition made simultaneously among the same groups of rural inhabitants.

(to be continued)

E. LELESZ

ORGANIZATION OF MILK RECORDING IN LITHUANIA

This article is a continuation of our enquiry on the Organization of milk recording in the different countries (see earlier Bulletins — February, 1940: The Netherlands, and March, 1940: Hungary). The report was drafted by the Cattle Breeders' and Milk Recording Associations Union of Lithuania, and transmitted to the Institute by the Lithuanian Ministry of Agriculture.

Development of milk recording.

Milk recording came into force in Lithuania in 1923, year when the first six milk recording associations were established. These associations increased rapidly in number and importance, as is seen from Table I.

TABLE I. — Development of milk recording.

| Year | Number of Associations | Number of stock-farms inspected | Number of cows tested | Percentage of cows tested to total number of cows |
|-------------------|------------------------------|--|-----------------------------|--|
| 1923 | 6 | 46 | 1 170 | 0.16 |
| 1934-35 | 138 | 2 810 | 34 041 | 4.15 |
| 1935-36 | 141 | 3 126 | 36 253 | 4.75 |
| 1936-37 | 155 | 3 647 | 40 569 | 5.25 |
| 1937-38 | 174 | 4 202 | 45 128 | 5.82 |
| 1938-39 | 189 | 5 226 | 50 351 | 6.80 |

Organization of milk recording.

The milk recording associations are co-operative organizations. In 1938-1939, the number of herds inspected varied, per association, from 16 to 70, and that of cows tested from 96 to 388; the average number of herds inspected amounted to 27.7, and of cows to 266.4.

Up to 1933, all the milk recording associations in Lithuania operated under a special central organization: the 'Lietuvos Centralinė Gulvijų Kontrolės Sąjunga' (Central Cattle Breeding Control Association of Lithuania). The objects of this organization were to form further recording associations, to co-ordinate and supervise the work of the member associations, to supply them with the material required for recording, to draw up and publish the annual results of the different associations. In 1933, for reasons of economy, this Association was replaced by another central organization called 'Lietuvos Galvijų Auginimo ir Kontrolės Rėtelių Sąjunga' (Cattle Breeders' and Milk Recording Associations Union). The sphere of activity of the new organization, therefore, embraces not only milk recording, but also work connected with cattle-breeding, *viz.*, registering of breed cattle, keeping of herdbooks, supervision, etc.

Milk recording is carried out by recorders (recording assistants) only. The State, through the intermediary of the Chamber of Agriculture, grants a subsidy to cover the expenditure involved: staff salaries, purchase of equipment, etc. Members of the associations pay an annual subscription of 1.25-2.50 lits per cow.

In recruiting recording assistants, preference is now given to graduates of the secondary School of Animal Husbandry at Gruzdžiai; formerly, persons were engaged who had successfully taken a special course in milk recording. The work of the recorders is supervised by instructors in animal husbandry, who also carry out inspection of cattle for registration in the herdbooks, control the breeding of stock for reproduction, organize small scale cattle shows (young stock) and courses in milking and dairy stock nutrition, and give lectures on different questions regarding animal husbandry during the short courses organized by the Chamber of Agriculture.

The control of milk recording operations was delegated to the Chamber of Agriculture by the Minister of Agriculture. There are no special laws on milk recording in force.

Methods of milk recording.

Up to 1930, recording was carried out every 2 or 3 weeks; since 1931-32, monthly inspection is the rule. From July 1, 1938, all herds inspected are divided into two groups: A and B. Group A comprises the herds where the annual yield per cow in butterfat exceeds 90 kg. All other herds, *i. e.*, in which the cows show an annual yield in butterfat of 90 kg. or less, are classified under group B.

Intervals between recording (1) are of about 30 days for group A, and from 45 to 60 days for group B. The object of dividing the herds into two

(1) Interval between recording means the interval between two controlled milkings.

groups is to increase the number of herds tested by the same number of recorders. The records for the herds in group *B* are semi-official.

The milkings of 24 hours are tested throughout the period of lactation, and calculated for the whole year (365 days). An endeavour is made to fix testing days during the middle of the test period (period of lactation). Up to 1930, the testing year began on January 1; this date was later changed to July 1.

Testing comprises: weighing, by means of a special balance, of the milk of each cow taken from the day's milkings, taking of samples of milk from each milking, determination of fat content. Fat content is determined on the farm by means of the special GERBER's portable apparatus. The quantity of feed consumed is also checked; in large herds, quantity is calculated per groups of dairy cows. Up to 1929, the food consumed was expressed in starch values, according to the KELLNER method; since 1930, the forage consumed is calculated in fodder units, identical to the Swedish units. In feed control, grazing days are also included, calculating according to the rationing tables, the quantity of fodder which the cows would have consumed based on their live weight and milk production (for example, a cow of 400 kg. giving daily on pasture 15 kg. of milk with 3.75 per cent. butterfat, requires for maintenance and milk production 8.28 fodder units per day). At the end of the year, the yield in fat for 100 fodder units consumed is also calculated for each cow.

Calculation of results.

The milk production of each cow during the period of testing is calculated by multiplying the quantity of milk weighed on the test day by the number of days of the test period. In calculating the quantity of fodder consumed during the test period by a group of cows (in large herds), if, after the test period has begun, a cow (*e. g.*, newly purchased) has been added to the group, the following system is adopted: the number of cows contained in the group during the entire test period is multiplied by the number of days in the period, and to this sum is added the number of days the newly purchased cow formed part of the group; the number of feed days of the group thus obtained is multiplied by the quantity of feed consumed per day by each cow of the group in question. The same lines are followed in calculating the quantities of feed consumed by the other groups during the test period. The annual average yield in milk and fat of a herd is calculated by dividing the total quantity of milk and butterfat by the average number of cows; this number is obtained by adding days of stable feeding and days of pasturage and dividing the sum by 365. The recorders do all calculations on the farm.

The principal registers of the recording associations are: the farm report book, milk recording register and annual reports register. All the data in the farm report book are transcribed in the main register in which calculation of the food consumed by each cow and by the whole herd is also made.

Utilization of records.

Records are important in breeding, and therefore, are entered in the Herd-books. Registration of animals in the Herdbooks is made, as stated previously in this article, by the instructors in animal husbandry of the Cattle Breeders' and Milk Recording Associations Union, who supervise the work of the recording assistants. Records are also necessary in cattle shows, where allocation of prizes depends on guaranteed milk and fat yield figures.

Performance and pedigree certificates are issued. Records play a decisive part in the cattle trade.

The value of bulls is based solely on the yield of the dams. As Herdbooks have only recently been established, it is not possible to estimate the value of bulls on the basis of the yield of their daughters.

Results of milk recording.

The following tables show the results obtained.

TABLE II. — Average yields of all cows tested in different years.

| Year | Milk Kg. | Fat % | Fat Kg. |
|-------------------|-------------|----------|------------|
| 1931-32 | 2 343 | 3.76 | 88.0 |
| 1932-33 | 2 412 | 3.68 | 88.7 |
| 1933-34 | 2 406 | 3.67 | 88.3 |
| 1934-35 | 2 453 | 3.73 | 91.4 |
| 1935-36 | 2 628 | 3.73 | 98.0 |
| 1936-37 | 2 661 | 3.75 | 99.7 |
| 1937-38 | 2 786 | 3.77 | 104.9 |
| 1938-39 | 2 825 | 3.79 | 107.1 |

TABLE III. — Ten highest milk yields of cows still living.

| No. | Year | Name and number of cow | Quantity of milk in kg. | Fat % | Fat kg. |
|-----|---------|----------------------------|----------------------------|----------|------------|
| 1 | 1937-38 | « Nixe » 9430 | 9 653 | 3.33 | 321.6 |
| 2 | 1938-39 | « Ruta » 14143 | 9 552 | 3.77 | 360.3 |
| 3 | 1935-36 | « Ateive » 3106 | 8 850 | 3.93 | 347.4 |
| 4 | 1938-39 | « Ruta » 14078 | 8 798 | 3.55 | 312.3 |
| 5 | 1938-39 | « Kiaune » 16614 | 8 765 | 3.39 | 297.2 |
| 6 | 1936-37 | « Matilda » 5789 | 8 746 | 4.14 | 362.4 |
| 7 | 1938-39 | « Kuosa » 5902 | 8 632 | 3.54 | 305.6 |
| 8 | 1938-39 | « Bambyte » 8615 | 8 619 | 3.71 | 319.9 |
| 9 | 1937-38 | « Zara » 6800 | 8 508 | 3.66 | 311.5 |
| 10 | 1937-38 | « Gyle » 7449 | 8 389 | 4.32 | 352.5 |

TABLE IV. — Ten highest fat yields of cows still living.

| No. | Year | Name and number of cow | Fat kg. | Yield of milk in kg. | Fat % |
|-----|---------|-----------------------------|---------|----------------------|-------|
| 1 | 1936-37 | « Matilda » 5789 | 362.4 | 8 746 | 4.14 |
| 2 | 1938-39 | « Ruta » 14143 | 360.3 | 9 552 | 3.77 |
| 3 | 1937-38 | « Zvaigzde » 5958 | 353.7 | 7 146 | 4.95 |
| 4 | 1937-38 | « Gyle » 7449 | 352.5 | 8 389 | 4.32 |
| 5 | 1935-36 | « Ateive » 3106 | 347.4 | 8 850 | 3.93 |
| 6 | 1938-39 | « Mazone » 3003 | 341.1 | 7 564 | 4.51 |
| 7 | 1935-36 | « Frede » 816 | 341.1 | 7 719 | 4.42 |
| 8 | 1938-39 | — | 331.2 | 8 030 | 4.12 |
| 9 | 1938-39 | « Gerute » 8521 | 330.4 | 8 370 | 3.95 |
| 10 | 1937-38 | « Aibe » 6156 | 323.3 | 7 691 | 4.20 |

MISCELLANEOUS INFORMATION

Agriculture in Argentina.

During a mission to Argentina, Prof. BOEUF gathered much information which he communicated to the French Academy of Agriculture (meeting of January 31, 1940), in an interesting report, the essential points of which are reproduced below. Comprehensive views of this description are extremely valuable from the documentary standpoint and it is hoped that many similar reports will be received for inclusion in the Institute's files.

POPULATION. DISTRIBUTION OF TERRITORY.

The territory belonging to the Argentine Republic covers an area of 2,790,000 square kilometres, or over 5 times the area of France, with a population of 13 million inhabitants (4.3 inhabitants per square kilometre), 60 per cent. consisting of town dwellers and 40 per cent. of rural population. The rural districts are therefore thinly populated, although the country as a whole is essentially agricultural in character.

Almost all the population is of European origin (native half-breeds amount only to 2.5 per cent. of the total population and are tending to disappear). The Mediterranean countries have supplied the largest number of inhabitants of European origin who subsequently took Argentine citizenship, as well as the greater part of the foreign population, the latter including: 930,000 Italians, 830,000 Spaniards, 94,000 Russians, 80,000 French, 65,000 Turks, 28,000 British and 27,000 Germans.

This Mediterranean origin and the complete absence of the racial problem explain how a real Argentine nation has been formed through the fusion of elements differing very slightly one from the other. A French visitor to the country receives a clear impression of a Latin civilization.

The distribution of the soil may be summarized as follows:

| | Present position (hectares) | Possibilities (hectares) |
|--|--------------------------------|-----------------------------|
| Cultivated land, particularly well suited to cereal crops | 30,000,000 | 80,000,000 |
| Pasturage, partially suited to cultivation . . . | 124,000,000 | 109,000,000 |
| Mountains and forests | 50,000,000 | 50,000,000 |
| Unproductive area | 75,000,000 | 40,000,000 |
| | <hr/> 279,000,000 | <hr/> 279,000,000 |

VEGETATION. CROPS.

Since Argentina extends in latitude from beyond the Tropic of Capricorn to the north as far as the cold regions of Tierra del Fuego to the south, the country offers a great variety of climatic and exceptionally favourable conditions for the most dissimilar crops.

The temperate zone produces: wheat, oats, barley, rye, maize, canary-grass, linseed, sunflower, alfalfa, tobacco, legumes, potatoes, grape, fruit trees, while the semi-tropical zone offers sugarcane, cotton, groundnuts, rice, cassava and maté.

The production of cereals and linseed is confined to the Central-Eastern region: the Provinces of Buenos-Aires, Santa Fé, Entre Rios, part of the Province of Córdoba and La Pampa Territory. These regions correspond in latitude to the Mediterranean Peninsulas and North Africa. They are the only areas visited by Prof. Boeuf and concerning which he is in a position to give a personal impression.

A visitor acquainted with the North African landscape cannot but be struck with the numerous points of resemblance between it and the grain area in the Argentine Republic. Even the wild vegetation is very similar: large areas covered with coarse gramineae, including a *Stipa*, very similar to the alfa growing on the high Algerian and Tunisian plateaux, groves of wild artichoke recalling those which characterize the deep, fertile soil in the North African regions.

The brushwood growing in certain parts of the Pampas, where the *Prosopis* is particularly common, is very like that which grows in North Africa.

Eucalyptus groves mark the sites of all the farms.

The same ornamental trees are used for bordering avenues, etc. (*Melia*, *Jacaranda*, plane, etc.).

The architecture of the villages in Argentina is very similar to that of the Algerian and Tunisian 'colonization centres.'

The climatic and soil conditions are, however, much more favourable than those ruling in most of the North African regions.

SOIL.

The cereal-growing region in Argentina consists of an immense plain, slightly inclined towards the Atlantic.

The whole of this plain is of alluvial origin; mostly river alluvions, with aeolian formations in the Pampas where many small hills are probably dunes rendered stable by the growth of grass and shrubs.

The river alluvions have left more or less dark soil, brown or grey in colour; cuts 5 or 6 metres in depth and some times even deeper show perfect homogeneity and complete absence of stones; one may travel for hundreds of kilometres without coming across any gravel.

Certain depressions where run-off water lies for some time, are impregnated with soluble mineral substances (probably chlorides and sulphates), and form an infinitesimal part of uncultivable land.

In the southern part of this region, slightly below the surface of the low ridges, a layer of 'tosca' is found, similar to the tufa crust so common in Northern Africa, but not very thick and generally somewhat broken up.

This absence of calcareous formations makes it very difficult to build a road system; so far Argentina has very few real highways (in concrete or macadam); there are, on the other hand, many tracks with a wide earthen bed; these are well-kept and are suitable for motor vehicle traffic during the dry season, but are not very practicable during the rains. The railway system is very extensive (nearly 50,000 kilometres and several French companies); most of the railways are concentrated in the cereal-growing region.

Due to its depth, the absence of coarse elements and to adequate rainfall the soil here is very fertile. The ground is cultivated every year without using any mineral fertilizers, and without any other addition except that provided by grazing animals.

The soil in the Pampas is light, often sandy and its mobility under the action of the wind, which is often violent, shows that it should really be used as grassland and for stockbreeding. Large areas have been thoughtlessly used for the cultivation of cereal crops and ploughing has led in a few years to the disappearance of the humus which gave this soil a certain stability; it has now become mobile again and is undergoing severe aeolian erosion which is eradicating cereals; we saw thousands of hectares of these fields "flying away," to use the picturesque local expression and returning to the state of dunes.

The experiment Stations in this region are studying how to remedy this unfortunate action of the wind. One of these stations, established at Bordenave by the Southern Railway Company, has obtained interesting results from sowing in lines at the bottom of furrows ploughed at right angles to the prevailing direction of the wind, provided the soil is only moved after having been wet.

This Station is also studying the creation of drought- and cold-resistant varieties of wheat, flowering late; cross-breeds between 'Eureka' wheat of luxurious growth and abundant yield but mediocre in quality and 'Pintad-Marquis' wheat of fine quality, seem to have given excellent results.

CLIMATE.

Climatic conditions in the grain area are as favourable to cereal production as the quality of the soil.

The average annual rainfall at Buenos Aires is 970 mm.; the rainfall declines towards the west but in the Pampas the average is still between 400 and 600 mm. annually.

The temperature at Buenos Aires fluctuates between 5° and 40° C. (average annual temperature 16° C.); fluctuations are more marked in the Pampas. Generally speaking, the irregular rainfall, the fairly high temperature and the frequent strong winds give the cereal growing area a semi-arid character, the effects of which are attenuated by the physical composition of the soil.

The northern part of the region, being warmer, is more favourable to the cultivation of maize and linseed.

IMPORTANCE AND DISTRIBUTION OF VEGETAL PRODUCTS.

Wheat was sown over an area of 7,236,000 hectares during the five-year period 1934-38 or a million hectares below the figure for the period 1929-1933. The output remained very much the same during both periods, the averages being slightly over 6 million tons, placing Argentina sixth as a wheat producing country (after the U. S. S. R., the United States of America, India, Canada and France). The Argentine Republic ranks second as an exporter (3,860,000 tons of wheat in 1936) coming after Canada and standing equal with Australia.

Maize is grown over an area varying between 6 and 7 million hectares, with an output of 13 million tons, between 7 and 8 of which for export; Argentina thus ranks second in the world as a producer of maize (coming after the United States) and first as an exporter.

Oats (1,330,000 hectares, 750,000 tons), Barley (800,000 hectares, 624,000 tons), Rye (860,000 hectares, 200,000 tons) are only secondary cereals, exports amounting respectively to some 300,000, from 300,000 to 400,000 tons and 150,000 tons. The low yield obtained from rye is explained by the fact this cereal is often used for winter grazing.

Linseed is one of Argentina's important agricultural products, the crop covering an area of 2,900,000 hectares with an output of 1,720,000 tons, or half the world output and 80 per cent. of the export trade in this product. Most of the crop is grown in the Province of Santa Fé, smaller quantities being grown in the Provinces of Entre-Ríos, Buenos Aires and Córdoba; France purchases over 200,000 tons of linseed yearly from Argentina.

Alfalfa is grown over an extensive area of over 5 million hectares. Almost all the crop is used as forage; it is an excellent forerunner to other crops.

We will limit mention of other crops to the following:

Groundnuts, grown in the north-east of the country over an area of some 100,000 hectares, with an output of 115,000 tons, processed in the country

Tobacco, producing about 20,000 tons, consumed by local industry.

Cotton, cultivated in the northern Provinces over an area of 400,000 hectares and giving between 50,000 and 75,000 tons of fibre, half of which is exported.

Sugarcane, confined to the north-west, produces nearly 400,000 tons of sugar grown over an area of 150,000 hectares; the output is sufficient to supply home consumption.

Grapes, are grown over an area of 169,000 hectares, mostly situated in the Provinces of Mendoza and San Juan at the foot of the Cordillera; these are dry regions where the soil produces only when irrigated; vines are also grown over small areas in the Río Negro territory. In 1938, the total output of wine amounted to 9,260,000 hectolitres.

It is perhaps a pity that the Argentines have decided to give most of their wines the names of French wines, adding, as a tribute to honesty, the words 'Argentine industry.' Doubtless this is a form of homage rendered to French wines, but the incontestable quality of the Argentine products would have fully justified using local names, thus avoiding confusion and stimulating competition among growers.

Fruit-growing finds very favourable conditions in Argentina: extraordinarily good soil, all types of climate, being situated in the southern hemisphere, so that the crops are harvested at a time when consumers in the other hemisphere are short of fresh fruit.

Rapid progress is being made with these crops (there are now between 14 million and 15 million fruit trees); almost every fruit is grown and it must be admitted that the Argentines have made a very happy choice of variety, appearance and quality of fruit.

Citrus fruits form the main crop along the northern shore: oranges, lemons, tangerines, grapefruit; there are also many groves where the trees were still too young to bear fruit. When it is recalled that there are extensive areas in Brazil, Cape Colony, Australia and North Africa also planted to groves of citrus fruits, it may be asked whether a period of over-production is not approaching.

Every variety of fruit is grown on the Paraná Delta and in the environs of Buenos Aires; one of the principal fruits is the peach, the entire production being absorbed by the federal Capital; the Delta oranges do not keep very well, probably owing to the extreme moisture of the soil.

The Río Negro Territory, to the south of the Pampas, where the climate is colder, produces chiefly apples, pears, peaches and table grapes.

The most important species are as follows:

Pear trees (2,800,000), including the French varieties, Beurré d'Anjou, Doyen de Comice, Passe-Crassane, Chrétien Bartlett;

Apple trees (2,700,000), mostly the North-American varieties;

Peach trees (over 2 million);

Plum trees (1 million);

Orange trees (1,126,000);

Tangerine trees (1,320,000);

Quince trees (1,400,000);

Table grapes (over one million plants).

It should be mentioned that very few olives are grown (some 17,000 trees). The reason lies in the fact that the tree takes too long to reach full production; Argentine planters prefer species which bring in quicker profits.

The officers of the Ministry of Agriculture exercise severe control over hygienic conditions on the plantations and of the fruit itself as well as supervising the handling of the fruit during packing and shipment. A visit to the fruit displayed in the town markets is a joy to the eye.

Fruit exports amount to nearly 30,000 tons, 3,000 of which are shipped to France (10,000 tons of grapes, as many pears and 4,400 tons of apples).

Brazil, the United States and England are the principal buyers, purchasing over 6,000 tons each.

STOCKBREEDING AND DERIVATIVES.

Wherever one travels in Argentina one sees flocks grazing over the land, even among the cereal crops. This is why estates are closed in by wire fences. These enclosures extending as far as the eye can see along the roadside, are characteristic of the Argentine landscape.

Stockbreeding is practised in the open, the animals being at liberty, except in certain establishments specializing in the production of animals for breeding. No stables are to be seen, no stacks of straw and forage; no cheaper method of stockbreeding could be imagined.

The best opportunity of finding the finest specimens of Argentine stock assembled in one place is to visit the splendid Agricultural Exhibition held yearly in Buenos Aires; we were lucky enough to visit this Exhibition several times during our stay in

the country. The prize-giving, presided over by the President of the Argentine Republic, is a public holiday; the importance attached to this event and the crowds which flock to visit the Exhibition, show that the population of the Argentine Republic realize to the full the importance of agricultural production and especially of stockbreeding in the country's economy.

The numbers of Argentine livestock are among the largest in the world: from 9 to 10 million horses, over a million donkeys and mules, 32 million cattle, 44 million sheep, from 5 to 6 million goats and between 3 and 4 million pigs.

There are many breeds of horses, the Percheron being much the most numerous (1,310,000 head); several other French breeds are represented, including Boulonnais and Breton Postier horses. These breeds supply excellent draught horses for field work and ploughing. Contrary to what might be expected, in spite of the facilities offered by the huge stretches of land without slopes or other obstacles, mechanized field work has not made much progress.

Race-horse breeding (Arabs and Anglo-Norman breeds), is fairly important as the Argentines love horse-racing and all games of chance.

Many English breeds are found among the cattle; over half the total number of head consists of Shorthorns (18 million head). This preference for English breeds is explained by the desire to content their chief meat-purchasing customer.

Milch cows (3 million) consist mainly of Durham cross-breeds, the Hollando-Argentine coming next. Record milk yields are obtained of over 7,000 and even as much as 10,500 kg. of milk per annum.

Sheep are represented by the Lincoln breed (14.5 million), Argentine Merinos (13 million), Romney Marsh (7.5 million), and Australian Merino (over a million). Sheep breeding is confined to the rich grazing lands in the Province of Buenos Aires and in the Patagonia Territories (Chubut and Santa-Cruz).

Pigs belong to the black or brown breeds (Duroc Jersey, Berkshire, Poland China).

Argentine breeders have devoted much care and attention to improving their breeds as may be seen from the quality of the animals on show at the Agricultural Exhibition. They often import first class breeding animals from Europe; animals produced in the country also fetch high prices; at the last Exhibition we saw a Shorthorn bull which had been awarded a first prize fetch 45,000 pesos at auction; the maximum ever attained was 152,000 pesos.

At the time of the 1930 census, the Argentines estimated the proportion of imported pure of cross-bred animals at 72 per cent. in the case of cattle, 91 per cent. for sheep and 72 per cent. for pigs.

The meat industry (chilled, frozen or tinned), is one of the most important branches of Argentine trade. This country ranks first among beef producers (45 per cent. of the world export) and second for mutton (20 per cent. of world export), coming after New Zealand and equal to Australia.

Twenty-two refrigerating plants, situated in the chief river and sea ports, have a total slaughter capacity per eight-hour day of 28,000 cattle, 67,500 sheep and 8,000 pigs. The 'Ango' refrigerating plant alone, at Buenos Aires can deal with 5,000 cattle, 10,000 sheep and 1,000 pigs in eight hours.

MM. RICARD and DIFFLOTH have described the chain work of one of these huge establishments where 5 butchers each kill an animal every ten seconds.

Exports (in 1936) totalled nearly 400,000 tons of beef chilled (9/10), or frozen, 50,000 tons of frozen mutton, 9,000 tons of chilled or frozen pigmeat and 72,000 tons of tinned meat.

Exports of salted or dried hides amount to 160,000 tons, 84 per cent. of which are ox hides, the remainder being obtained from horses or sheep.

Argentina ranks third as a producer of wool, coming after Australia and the United States; the wools produced are merino (15 per cent.), fine cross-bred (20 per cent.), medium cross-bred (20 per cent.) and coarse cross-bred (40 per cent.).

Exports total 130,000 tons and some 30,000 tons remain in the country for home industries which made considerable progress during the European war (1914-1918).

The dairying industry produces 30,000 tons of butter annually, between 8,000 and 10,000 tons being exported; 25,000 tons of cheese of the Italian and French types, almost entirely consumed within the country, without counting casein, in the export of which Argentina ranks first.

* * *

This rapid survey of agricultural activities in Argentina shows:

that this country, due to both soil and climatic conditions, is one of the privileged countries as regards vegetal production and stockbreeding and is destined to become one of the richest granaries of the world;

that, in spite of her small farming population, it already ranks among the first countries and is sometimes absolutely first in production and export of foodstuffs of prime necessity: wheat, maize, wine, meat, butter, hides, wool, linseed, evidencing the industrious character of Argentine farmers, the excellent organization of the industries and trade in agricultural products as well as the efficient efforts made towards a steady improvement by private enterprise and official services.

G. R.

***Polymnia edulis*, a forage plant used for the production of alcohol.**

Polymnia edulis Weddel is a composite plant similar to the Jerusalem artichoke (*Helianthus tuberosus* L.). It grows to a height of 2 metres above the ground, and consists of large stems with very thick foliage; the leaves are large and triangular. Below the ground it consists of a strong bunch of tubers, some of which are very large and weigh over 500 grams each; they are long and smooth like those of the dahlia. The tubers may be eaten raw and taste like a pear but they become hard when cooked. Livestock like the taste of both the tubers and the part which grows above ground. These tubers are similar to those of the Jerusalem artichoke in that they do not keep well after removal from the ground. The plant is native to the regions of the Andes and Colombia, where it is commonly known by the name of 'Jacón'. The parts of the plant which grow under ground resist the winter cold of northern Italy, but this plant is best adapted to warm temperate regions, where it remains green and continues to grow until after December.

Polymnia edulis was suggested with the sweet sorghum in 1927 as suitable for the production of alcohol in Italy. The following results were obtained from an analysis made at that time:

| | |
|--|---------|
| Saccharose | 0.90 % |
| Reducing sugars | 0.64 % |
| Inulin | 10.20 % |
| Total fermentable substances | 11.74 % |

Since then acclimatization and selection of this plant have been continued at the San Remo experiment Station of Floriculture. All the plants at present grown have been produced from a single strong and productive plant which resisted the cold experienced in 1929.

| | Stalks 51.70 % of plant growing above ground | | Leaves 48.30 % of plant growing above ground | | Tubers (absence of starch) | |
|--|--|-------------------|--|-------------------|-------------------------------|-------------------|
| | In fresh state | In dried state | In fresh state | In dried state | In fresh state | In dried state |
| Moisture | 86.70 | — | 83.20 | — | 69.50 | — |
| Ash | 1.35 | 10.23 | 2.68 | 15.98 | 2.04 | 6.71 |
| Protein substances (N \times 6.25) | 1.51 | 11.37 | 2.87 | 17.12 | 2.22 | 7.31 |
| Gross fat | 0.30 | 2.26 | 1.24 | 7.40 | 0.13 | 0.43 |
| Cellulose | 3.57 | 26.85 | 1.68 | 10.04 | 1.75 | 5.73 |
| Reducing sugars | 0.62 | 4.72 | 0.48 | 2.86 | 0.92 | 3.03 |
| Non-reducing sugars | 0.93 | 6.98 | 0.96 | 5.72 | 18.75 | 61.50 |
| Non-nitrogenous extractives (f. d.) | 5.02 | 37.59 | 6.89 | 40.88 | 4.09 | 15.29 |
| | 100 — | 100 — | 100 — | 100 — | 100 — | 100 — |

In 1939, an analysis was made at the Station of Agricultural Chemistry, Turin. Samples were taken in December when the plant was in bloom.

The fodder is richer than that of the Jerusalem artichoke. The tubers contain the following fermentable substances:

| | in the fresh state | in the dry state |
|---|-----------------------|---------------------|
| Reducing sugars | 0.92 % | 3.03 % |
| Non-reducing sugars | 18.75 % | 61.50 % |
| Non-nitrogenous extractives (f. d.) . . | 4.69 % | 15.29 % |
| | 24.36 % | 79.82 % |

BOUSSINGAULT considers that Jerusalem artichokes contain 16.10 per cent. of fermentable matter. The following test, carried out in 1939 by M. CALVINO, who sent us the above information, gives an idea of the yields which may be obtained. Clayey-calcareous soil: pH = 7.80. Former crop: carnations. Manure: none before planting; two applications of liquid fertilizer during growth. Planting: April 18, with small tubers set in furrows measuring 0.90 \times 0.30. Cutting of the growth above ground: December 18, 8 months after planting.

Yield in green fodder: 360 quintals per hectare.

Yield in tubers: 380 quintals per hectare.

Total yield: 740 quintals per hectare.

Counting the fermentable substance at 24 per cent. this would give about 91.20 quintals of fermentable matter, with an approximate yield varying between 45 and 46 quintals of alcohol.

A. H.

Daily bread and the wheat embryo as a source of vitamin E.

As the result of numerous experiments, it has been proved that the lack of vitamin E may be the source among animals of certain disturbances affecting their reproductivity or may even lead to complete sterility. Females are, however, less affected by this lack than males. Vitamin E is indispensable to pregnant or nursing females for the growth of the foetus and production of whole milk.

The death-rate among infants receiving vitamin E in their mother's milk is lower than among other children. Certain chemical substances are known to have the physiological action of vitamin E: tocopherol α , β and γ . Vitamin E is found in green vegetables, leaves and grain, in yeasts, meats, liver, egg-yolk, etc.; the greatest quantity is found, however, in the wheat embryo.

From the quantitative aspect, the wheat embryo represents about 1.5 per cent. of the weight of the ear, and consequently is of little importance from the standpoint of nitrogen and carbohydrates in the food. It is however very important from the qualitative standpoint because of its content of Vitamin E.

Oil of wheat embryos in the pure state is used to prepare concentrates of vitamin E (the process of manufacture is patented). Vitamin E is used therapeutically in cases of asymptomatic sterility and habitual abortion.

The fertility vitamin is especially abundant in a healthy and fresh wheat embryo, but ordinary white bread contains very little "because more than 80 per cent. of this vitamin is thrown away" (W. KRAFT). It would therefore be very important to include it among the products used for breadmaking.

E. L.

BOOK NOTICES *

MARTIN, C. R. A., *Practical food inspection*. London, H. K. Lewis & Co., Ltd., 1940. Vol. I, 316 pp., 138 photos, Vol. II, 275 pp. 58 photos.

The first volume of this work, entitled 'Meat inspection', contains general theoretic notions, and a detailed explanation of the methods which should be used in meat inspection.

The first chapter deals with the physiology and anatomy of domestic animals. Chapter II gives the essential elements required to recognize the age of animals to be slaughtered, stressing the importance of an *ante-mortem* examination of animals in a rational system of control. The A. also mentions the differences in anatomical structure presented by animals according to their sex, describing the external factors on which to base diagnosis of a whole, series of diseases such as tuberculosis, actinomycosis, epizootic diseases, mastitis, etc. Chapter III gives the necessary indications concerning hygiene and modern technical methods in slaughterhouses, together with an explanation of the problem of salting meat and preparing it for transport. Chapter IV deals with special methods of meat control and describes the administrative and sanitary measures in force in this connection. Physiological and pathological changes which may occur in products of animal origin (muscles, organs, etc.), are described in Chapters V and VI. In a brief note the A. deals with constitutional diseases such as rickets, osteomalacia, etc., mentioning uraemia, anaemia, hydraemia, leucocythaemia or leukaemia. The first part of Chapter VII deals with chronic diseases and, in greater

* Review of books presented to the Library appear under this heading.

detail, with the problems concerning the etiology and diagnosis of tuberculosis. The second part of this chapter describes septic diseases and the third part contagious diseases. Chapter VIII deals with parasites. Chapter IX describes methods for the preservation of meat.

The second volume of this work is entitled 'Fish, poultry and other foods'. Chapter I deals briefly with the anatomy of fish, describing the different species, edible smalls and crustaceans, and mentioning the parasites and diseases which affect fish. Chapter II deals with poultry and game. In Chapters III, IV and V the A. describes vegetal products, especially fruit, vegetables and cereals, milk and dairy products. Chapter VI is devoted to information indispensable to officials entrusted with the control of meat and meat products, sausages, ham and salt bacon, margarine, etc. Information is also given concerning the control of eggs and, more briefly, sweet products, jams, liqueurs, mineral waters, ciders, etc. Chapter VII gives information concerning poisoning caused by certain foodstuffs, with a description of control measures in cases where poisoning of this kind is suspected. Chapter VIII, which is the last, is a collection of all legislative and administrative measures with which sanitary inspectors, veterinary surgeons and doctors must be familiar.

As the A. says himself in his preface, in compiling this work for the use of students, inspectors, doctors and veterinary surgeons, every effort has been made to avoid an excess of purely theoretical details. Nevertheless, it contains all the informations indispensable to those wishing to do serious practical work in the field of food control. A book of this kind was necessary, as is proved by the fact that the present work has just been revised and re-edited by the A., following the receipt of numerous requests. An appendix is attached to each volume containing a carefully compiled index of the subjects dealt with in the book.

E. L.

NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE for the third quarter of 1940 (*)

- ALBANIA...; rivista mensile di politica, economia, scienze e lettere. Roma, v. 1 (1940)–, mens. L. 100 int.; L. 200 étr. [Second title in Albanian: Shqipëri.] [Text or summaries occasionally in Albanian].
- AL-MADJALLAH az-zira'iah as-souriah. Damas, v. 1 (1938–39)–, mens. (Ministère de l'économie nationale (Agriculture). [Second title in French: Revue agricole syrienne; publication mensuelle de propagande et d'extension agricoles.] [Text in Arabic].
- BAHIA rural; organ da economia bahiana. Bahia, v. 5 (1938)–, mens. 25\$000. int.; 30\$000 étr.
- BESTEMMELSER av Administrasjonsrådet. Oslo, 1940–, irr. (Formerly: Norsk lov-tidende).
- BOLETÍN bibliográfico. Buenos Aires, Biblioteca, Dirección de propaganda y publicaciones, 1936–, mens. (Republica Argentina. Ministerio de agricultura de la Nación).
- BOLETÍN de policía sanitaria de los animales. Buenos Aires, Dirección de propaganda y publicaciones del Ministerio de agricultura de la Nación, n° 124 (1936)–, mens. (Dirección de ganadería).

(*) *List of abbreviations*: bihebd. (biweekly); bimens. (twice monthly); bimestr. (every two months); déc. (every ten days); étr. (foreign price); fasc. (copy); hebd. (weekly); int. (home price); irr. (irregular); mens. (monthly; n° (number); N. S. (new series); p. a. (per annum); q. (daily); sem. (half yearly); s. (series); trihebd. (every three weeks); v. (volume); trim. (quarterly).

N. B. — Between brackets [] are given translations and explanatory notes not appearing in the title of the review.

- BRÉSIL. Inspetoria federal de obras contra as sêcas. Boletim... Rio de Janeiro, v. 10 (1938)-, trim. (Ministerio de viação e obras públicas).
- COLORADO farm bulletin; quarterly publication of Colorado experiment station. Fort Collins, Colorado state college of agriculture and mechanic arts, v. 1 (1939)-, trim.
- DAKOTA. (Sud). Agricultural experiment station, Brookings. Technical bulletin. Brookings, State college of agriculture and mechanic arts, n° 1 (Apr. 1939)-, irr.
- OGORUL românesc; organ saptamanal de propaganda și popularizare agricola. București, Ministerul agriculturii și domeniilor, v. 1 1939)-, hebd. [Romanian land].
- OSTSEE-ZEITUNG. Tallin, Tallinna kirjastus-ühisus, v. 1 (1.VI.1940)-, q. Ls. 33.60 int.; RM. 24.— étr.
- PIANTE e fiori; giornale dell'Italia floreale. Milano, v. 5 (1939)-, mens. L. 25 int.; L. 50 étr.
- PLANTERS gazette and annual; dedicated to the cause of planters and planting in India. Calcutta, v. 1 (1939)-, mens. Rs. 6/- int.; 15s. étr.
- TIERRAS y aguas; organo de los Departamentos de tierras y aguas. [Bogota], Ministerio de la economía nacional, v. 2 (1939)-, mens.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

SORGO *

Some sixty years ago sorgo was much vaunted as a possible rival of sugar cane and beet as a source of saccharose, but until recent years it was cultivated only for the production of syrup and forage. Recent studies, carried out for the most part in Italy, are giving sorgo an important place in the category of industrial plants suitable for the production of alcohol, with cellulose as a by-product. The following descriptive article illustrates the stage reached in the cultivation of sorgo as 'a source of sweet substances', with details of the results obtained or expected.

General.

Although a native of the tropics, sorgo adapts itself to conditions in the most varied types of countries. Cultivated in Africa and Asia for a very long time, it is to be found in the equatorial, tropical and subtropical areas of the various continents and even in temperate zones. In the United States and Manchuria it grows as far north as the 45th parallel and it has even been known to ripen in Europe on the same parallel as Paris (49°).

The chief product obtained from sorghum is in some cases the seed, used as a foodstuff for either man or livestock; in other cases, the principal product is the sweet juice contained in the stalk or cane of certain types and varieties, or else the whole plant is used as fodder for livestock, while in yet other instances the panicle is used as the raw material for the manufacture of brooms (broomcorn sorghum, *Sorghum dochna* var. *technicum*). The different uses to which this plant is put have given rise to the cultivation of specialized varieties. Nevertheless, all varieties of sorgo, numerous varieties of the grain sorghum and some of the broomcorn sorghums may be used as fodder; after the grain has been gathered or the panicle removed, the stalks of the grain and broom sorghum may also be used as fodder for livestock.

The present article will be confined to a study of sorgo grown for the production and use of its content of sweet juice, and not as a fodder crop.

* In this and the following articles, the well established practice in the United States of referring to the sweet-stemmed or sugar sorghum as 'sorgo' will be followed.

History.

It would appear that sorgo was grown in very ancient times both in Africa and in the warm regions of Asia.

PLINY says that it was introduced into Italy from India ten years before he wrote his *Natural History*.

ARDUINO began to study its cultivation in the region round Padua, Italy in 1775 and he seems to be the first person to have succeeded in obtaining sugar from this plant. He describes several varieties in his book published in 1786; one of these, *Holcus cafer*, is probably identical with the 'Planter' variety now grown in the United States (C. R. BALL).

After ARDUINO's work, sorgo was forgotten until 1851, when MONTIGNY, French consul at Shanghai, sent home a batch of sorgo seed cultivated on the island of Chung Ming, situated in the estuary of the Yang Tse river at 32° Lat. N.

One seed of the whole batch germinated and produced 6 stalks whose seeds were distributed among the members of the Toulon Agricultural Assembly. A gardener from Hyères, who received some of these seeds, gathered 800 seeds from his plants and sold them to the Vilmorin firm for 800 francs. These seeds, widely distributed throughout Europe and the United States, are the source of the Chinese varieties of sorgo.

An English planter, LEONARD WRAY, discovered 16 varieties of sorgo in Natal and imported them into France in 1854 and the United States in 1857.

Conditions were favourable to the spread of the plant in the United States. The methods and material required for extracting sugar from sugar cane were already known, while planters in many areas were accustomed to use maple juice for the manufacture of syrup. As early as 1860, 6,749,123 gallons of sorgo syrup were produced in the country. The sugar shortage resulting from the War of Secession led to a demand for sorgo syrup as a substitute and production increased to over 16,000,000 gallons in 1870.

The sugar content of sorgo is in the form of saccharose and reducing sugars which prevent the cristallization of the saccharose. Many experiments were made in the hope of solving the difficulty, especially between 1878 and 1885 in the United States and from 1880 to 1888 in France and Italy.

The research work carried out by the U. S. Department of Agriculture was directed towards finding out whether sorgo could be used economically for the manufacture of sugar. The work had two objectives: (1) to discover an economic process for extracting the juice and manufacturing sugar; (2) to increase the sugar content of the plant. Considerable progress was made and at one time it was hoped that sorgo would prove a serious competitor to sugarcane and sugar beet. All these attempts to produce sugar from sorgo were unsuccessful. The only satisfactory process for crystallizing saccharose called for the use of large quantities of alcohol and the alcohol laws consequently rendered it impracticable. VILMORIN made every effort to isolate a type of sorgo which would make it possible to establish a sugar industry in Southern France, Italy, North Africa and in all countries where the climate is too cold to admit of the cultivation of sugarcane or too hot to afford the sugar beet a normal cycle of growth.

Meanwhile the sugar beet industry was developing rapidly and gaining ground even in temperate warm countries such as Italy. In 1888, when the sorgo sugar factories in Piedmont and Lombardy were with difficulty producing 100 quintals of sugar, the first small sugar beet factory installed at Rieti was turning out 5,000 quintals. This was the final blow to sorgo in Europe.

During the 1914-1918 war some fruitless attempts were made in France, but they sufficed to confirm the different findings and research work carried out previously in connection with the value of the sorghum as a plant from which alcohol can be obtained. A start was made in 1930, and in 1935-36 in particular, the question was taken up seriously from this standpoint in Italy, where a special effort was made to perfect and extend the cultivation of a crop which was considered as offering the best prospects for economic production of large quantities of fuel alcohol to replace imported liquid fuel and thus contribute towards the self-sufficiency campaign.

Description of the plant.

Sorgo is a gramineous plant varying in height from 1 to 2.50 m. and over, its aspect being similar to that of maize. It is characterized by an inflorescence in the form of a panicle, the main axis of which is elongated; the branches are alternate, whorled, semi-verticillate, scattered, which stand up erect when the plant is young and open out when it is ripe. The spikelets appear at the end of the branches in twos, threes or fours, but generally in threes. The fertile spikelet, single or terminal, is accompanied by two sterile spikelets which are almost lateral. The glumes are villous, red or black when ripe. The fruit is an almost spherical obovate caryopsis, slightly flattened on the sides with a dark spot at the top in place of the style. (PIEDALLU).

The underground portion of the plant consists of short internodes, each of which develops adventitious fibrous roots. The original radicle disappears after the appearance of the first internode and the formation of the first adventitious roots. Sorgo easily forms adventitious roots on the internodes nearest the soil surface. Even the highest internodes have small protuberances at their base which are the beginnings of adventitious roots; these develop if the stalk lodges. The lateral buds then put out secondary shoots which form new stalks.

The stalk has a full culm, the central part of which is formed of porous tissue with a high content of juice which in the adult plant contains the sugar. The stalk consists of a series of internodes, short towards the base and lengthening towards the tip. The peduncle is the fairly long part of the stalk beginning at the last node and bearing the main ear. Each node carries a single leaf whose sheath surrounds the stalk, often reaching the highest node before the blade opens out. These leaves are flat, alternate and sheathing. They grow to between 50 and 80 cm. in length, while the broadest part varies from 5 to 10 cm.; they are a rich green in colour. The central nervure stands out on the under side and the blade is entire.

A bud grows in the axil of each leaf, except at the highest node where the peduncle begins. The underground buds and those at the foot of the stalk

often produce secondary stems, numbering 5 or even 10 on each plant. The upper buds may also produce lateral branches which grow to a greater height than the terminal inflorescence and may even flower and bear fruit. The stalk is green and it only becomes paler and eventually yellow when the seeds ripen; the base of the culm remains green with more or less deep red markings. The red colouring often observed on the stalks late in the season is due to the formation of colouring matter as a reaction to attack by parasites or to some lesion.

Botanical classification of the sorghums.

The immense area over which this plant grows and the very large number of wild or cultivated forms, make it extremely difficult to classify sorghum. Many attempts have been made but, since they started from too limited a number of varieties, they have had to be revised periodically. It will not be out of place to make a brief survey of these attempts.

LINNÉ classified the sorghums with the *Holcus*. MOENCH (1794), separated *H. saccharatus* Linn. and *H. bicolor* Linn. and made them the basis for a new genus *Sorghum*.

In 1804, BROTERO recognized the affinities of the *Sorghum* with *Andropogon* and classified it in this genus. KÖRNICKE (1885), placed the cultivated sorghums among the varieties of a large species for which he maintained the name of *Andropogon sorghum* Brot., giving the synonyms of *Holcus sorghum* Linn., *H. durra* Forsk. and *Sorghum vulgare* Pers. At the same time he advanced the theory that all cultivated sorghums were derived from a single wild species *Andropogon halepensis* (*Holcus halepensis* Linn.).

In 1889, HACKEL divided *Andropogon sorghum* into two sub-species: *halepensis* and *sativus*, grouping all cultivated forms under the latter.

HACKEL's *Andropogon sorghum sativus* corresponds to KÖRNICKE's *Andropogon sorghum* and to *Sorghum vulgare* Pers. We will not enter in detail into further research work and study carried out by SCHUMANN (1895), BUSSE and PILGER (1902), BENSON and SUBBA RAO (1906), CAPUS and BOIS (1912), BELL (1913), PRAIN (1917), PIEDALLU (1923) and PHILIPPS (1925).

In 1936, SNOWDEN published a detailed work on the cultivated types of sorghum, with a classification and a description of the 'sativa' series. A summary of SNOWDEN's classification will be found in the table given on p. 355.

Varieties cultivated for grain or sweet stems are found in all the sub-series, except in *Drummondii* and *Durra*.

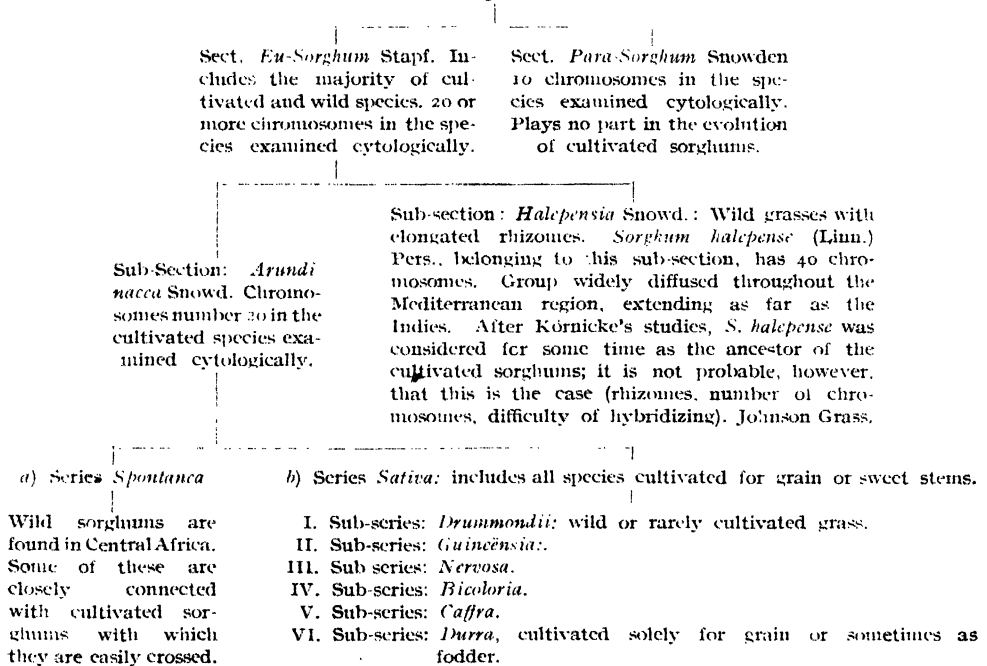
Nevertheless, the majority of the sugar sorghums cultivated in the United States and Europe belong to sub-series IV *Bicoloria* and, within the series, they belong in particular to the different varieties of *Sorghum dochna* (Forsk), Snowd. Others are found in the varieties closely allied to *Sorghum bicolor* (Linn.) Moench and in the sub-series *Caffra* (*S. caffrorum* Beauv., *S. nigricans* Snowd., etc.).

The cultivated varieties 'Minnesota Amber', 'Red Amber', 'Honey', 'Collier' and 'Planter's Friend' are probably varieties of *S. dochna*; 'Goose-

neck' is a variety of *S. bicolor*: 'Sumac' is a variety of *S. nigricans* var. *angolense*; 'Orange' and 'Sapling' belong to the *S. caffrorum* varieties.

The following are a few synonyms of *Sorghum dochna* (Forsk.) Snowd.: *Sorghum saccharatum* Moench. (1794); *Sorghum vulgare* var. *saccharatum* Boerl. (1890); *Holcus saccharatus* Linn. (1753); *Holcus dochna* Forsk. (1775); *Holcus sorghum* var. *saccharatus* Bailey (1923); *Andropogon saccharatus* Raspail (1825); *Andropogon sorghum* var. *saccharatus* and var. *leucospermus* Koern. (1885); *Andropogon sorghum* sub-species *sativus* var. *saccharatus* Hack (1889); *Andropogon sorghum* var. *dochna* Chris. (1922); 'saccharine sorghum' from Tsung Ming, China, U. S. Dept. of Agr. Bur. Pl. Industr., Bull. No. 175, 24, 25 (1910); *Andropogon sorghum* ('Pyaung' or 'Millet'), AUBERT in "Agr. Journ. India", 5, 222, 1910; 'sorgho type chinois' (*S. saccharatum*) PIEDALLU in "Le Sorgho", 1923.

Sorghum



Development of sorgo and its requirements.

Heat and light. — Sorgo is a native of hot countries and, although it has become acclimatized far into the temperate regions, it still requires a great deal of heat, more, in fact, than does maize. Germination begins at between 50 and 54° F.; at 60° F. it is still comparatively slow. Between 60 and 75° F., not only the rate but also the percentage of germination is lowered in relation to the optimum, which is around 95° F. The plant grows best at this temperature.

Sorgo is a plant which seeks the light and fears the shade at all stages of growth. Sunshine is an important factor for its growth and frequent mists affect the vegetative cycle.

Experiments made by H. N. VINALL and H. R. REED have shown clearly the influence of heat and other meteorological factors on the growth of sorghum. Several varieties of sugar and grain sorghum were cultivated at Chillicothe, Texas; Bard, California; Chula Vista, California, and Puyallup, Washington, the climatic conditions being widely different in all these places. The average temperature during the months of growth was 75° 6 F. at Chillicothe, 81° 8 F. at Bard, 62° 4 F. at Chula Vista and 60° 4 F. at Puyallup. The plants were abundantly supplied with water, either by the rains or by means of irrigation. The authors knew by experience that the climate at Chillicothe is perfectly suited to sorghum. The several varieties cultivated ripened within an average of 106 days. Plant development took 129 days at Bard, but a later experiment showed that if sowings are delayed this period may be reduced to 108 days. An average of 141 days was required to ripen sorgo at Chula Vista, while at Puyallup, even after 143 days the plants had made only mediocre progress, certain varieties only having started to form ears. There is little difference between the average temperatures during the vegetative cycle at Chula Vista and Puyallup, and this difference would not seem to be sufficient to account for the failure registered at Puyallup in comparison with the perfect ripening of the plant in the other case. Obviously, on the one hand the temperature was too low, but the amount of light was also insufficient (46.4 per cent. and 68.4 per cent. of the total possible amount at Puyallup and Chula Vista respectively).

Granting that 50° F. is the lowest limit of temperature possible for the growth of sorgo, the number of degrees of positive temperature used by the plants was 3,080° F. at Chillicothe, 4,236° F. at Bard, 1895° F. at Chula Vista and 1615° F. at Puyallup. But account must also be taken of light and other meteorological factors. The difference in the period required for growth at Chula Vista and Bard is undoubtedly a correct measure of the influence of lower temperature and a lower actinic value of the sun's rays at Chula Vista, where frequent fogs hide the sun in the morning and evening and where the temperature rarely goes above 70° F. during the greater part of the day. At Bard, on the other hand, the sky is generally quite cloudless and over quite a long period the daily temperature reaches a maximum of over 100° F. These favourable conditions not only shortened the period of growth but produced large plants with thicker stalks and foliage, the leaves being longer and broader and the ears larger.

As a result of their observations H. N. VINALL and H. R. REED also concluded that the date for planting should be chosen so that germination and early growth take place during a period when the temperature is at its maximum, flowering and fructification thus occurring at a more moderate temperature. In other words, sowings should not be made at too early a date.

If heat is necessary, cold or an insufficient temperature cause a stoppage and consequent weakening of growth; the plants droop and offer but slight

resistance to the pests and diseases to which sorgo is liable. Spring cold is very injurious and may lead to the disappearance of the sowings which have consequently to be renewed.

Water. — When studying the relations of a plant with water, a distinction must be made between its consumption of water and its resistance to drought. This resistance may depend on many factors, and, in particular, on its growth cycle, the strength of its root system, and its ability to recover from a long period of drought. It has always been observed that sorgo stands up well to drought, much better than maize, in fact.

Water consumption. — Several authors have studied the quantity of water evaporated by sorgo to form dry matter, and the figures obtained are interesting as a comparison.

I. J. BRIGGS and H. L. SHANTZ obtained the following results with various plants, including several varieties of sugar or grain sorghum.

Water consumption at Akron, Col. according to BRIGGS and SHANTZ.

| Plants and varieties | Water consumption per unit of dry matter |
|---|--|
| Sorghums (<i>Andropogon sorghum</i>): | |
| Minnesota Amber | 274 |
| Kafir | 292 |
| Kowliang | 282 |
| Milo | 311 |
| Durra | 312 |
| Maize (<i>Zea mays</i>): | |
| Esperance | 229 |
| Indian Flint | 329 |
| Legum | 369 |
| China White | 369 |
| Beetroots (<i>Beta vulgaris</i>): | |
| Sugar beets | 377 |

Professor LUIGI MANZONI obtained the following results at the 'R. Istituto Tecnico Specializzato per la Viticoltura e l'Enologia' at Conegliano, Italy:—

*Water consumption per unit of dry matter produced at Conegliano, Italy.
Entire plant.*

| Sugar beets | | 'Caraguna' maize | | 'Nostrano dell'Isola' maize | | Sorgo | |
|-------------|-------|------------------|-------|-----------------------------|-------|-------|-------|
| 1936 | 1937 | 1936 | 1937 | 1936 | 1937 | 1936 | 1937 |
| 251.4 | 267.8 | 190.8 | 180.8 | 188.8 | 188.5 | 153.3 | 158.2 |

By considering the evaporated water in relation to the weight of stripped sorgo stalk and not to the total amount of dry matter, a harvest of 300 quintals of cane per hectare would require the evaporation of a layer of water 270 mm. in depth.

Briefly, the results of research work all show that the relative consumption of water is much lower for sorgo than for maize.

Drought resistance. — The low consumption of water by sorgo varies in relation to the different stages of growth. MANZONI observed these variations during the months of June, July, and August.

*Economy in water consumption by sorgo at Conegliano, Italy,
as compared with sugar beet and maize.*

| Period | Economy as compared with sugar beet | Economy as compared with maize: 'Nostrano dell'Isola' | Economy as compared with maize: 'Caragua' |
|--------------------------------|---|--|---|
| | % | % | % |
| 1936 | | | |
| Month of June | 81 | 77 | 72 |
| Month of July | 49 | 37 | 18 |
| August 1 to 15 * | 35 | 10 | 8 |
| On total consumption | 39 | 19 | 19 |
| 1937 | | | |
| Month of June | 91 | 73 | 67 |
| Month of July | 42 | 34 | 27 |
| August 1 to 15 | 26 | 22 | 18 |
| On total consumption | 31 | 16 | 12 |

* Figures for sugar beet run from August 1 to 20, when the crop is harvested.

This low consumption of water during the months of June, July and August may play a very important part in drought resistance. When the soil is well tilled, it loses very little water in proportion to the amount exuded by plants. A part of the water economized at the outset of growth may allow the sorgo to continue its vegetative process throughout the following months.

After studying the reasons for this lower consumption of water, L. J. BRIGGS and H. L. SHANTZ observed that the transpiration of different plants per unit of leaf surface shows less variation than the transpiration per unit of dry matter produced. In other words, in their opinion, the greater efficiency in the use of water appears due to a reduction of the plant surface area rather than to a reduction in transpiration per unit of surface.

When he studied the comparative drought resistance of sorghums and maize, J. H. MARTIN observed that sorghum leaves have more stomata per unit of area, the stomata being smaller than those of maize leaves, while in each case sorghums show typical xerophilous characteristics. The sorghum plant has more

secondary roots than maize and its foliage is not so thick; its leaves and stalks have a waxy and cutinized epidermis which reduces evaporation. Under conditions of intense evaporation, sorghums evaporate less than maize and their leaves fade more slowly. After a period of lethargy due to drought this resistance to fading enables the plant to recover when moisture returns. If the main stalks have been killed off by drought before the rains come, sorghums may nevertheless produce secondary stalks and still yield a good crop.

Comparing the root system of the two varieties of sorghum 'Blackhull Kafir' and 'Dwarf Milo' with the 'Pride of Saline' variety of maize, E. C. MILLER has noted that at the different stages of growth the primary root system of sorghum shows the same development as that of maize. On the other hand, both these varieties of sorghum have at all times twice as many secondary roots as maize, *i. e.*, a root system with twice the power of absorption. Again, maize has a leaf area about twice as large as that of the 'Dwarf Milo' and once and a half as large as that of 'Blackhull Kafir'.

Confirming these observations concerning the root system, J. P. CONRAD found that sorghum plants grown as a border along the edges of a field sought out water as far away as six feet from the border, while maize roots only extended to a distance of 4 feet. Maize used nitrates to a depth of 8 feet and moisture to a depth of 9 feet; sorghum absorbed nitrates down to 10 feet and water to a depth of 12 feet.

E. C. MILLER and W. B. COFFMANN observed that the quantity of water transpired by sorghums and maize during a given period may be classified in relation to the leaf surface. The quantity of water evaporated by the plant is, however, not in proportion to its leaf surface. All varieties of maize used in their tests evaporate *more* water per plant than any variety of sorghum. On the other hand, their percentage of evaporation per *unit of area* was, with the single exception of the kafirs, *always lower* than that of the sorghums. This difference in the degree of evaporation was at its maximum when the plants has reached their full growth and when the difference in leaf surface of these plants was at its greatest. This difference in transpiration per unit of area was also more evident when evaporation conditions were most severe. Maize is incapable of supplying its large leaf surface with sufficient water to satisfy the evaporative power of the air; consequently its transpiration per unit of leaf surface becomes lower than it would be if the supply of water were sufficient. Sorghums, on the other hand, with their small leaf area, are able to supply enough water to satisfy the evaporative power of the air and consequently they transpire more water per unit of area than does maize.

From another experiment, E. C. MILLER observed that when the quantity of water contained in the maize leaves reached a minimum of 112 grams per square metre of leaves, it became a limiting factor in the production of dry matter. On the other hand, a minimum water content of 98 grams per square metre of sorghum leaves did not appear to check the production of dry matter.

To sum up, sorghums consume less water than maize per unit of dry matter produced and show a greater resistance to drought. This lower consumption and greater resistance appear due to the secondary roots being more abundant

and longer, its leaf surface smaller and better suited to economizing water and to the faculty possessed by the leaves of producing dry matter with a smaller supply of water. When there is a prolonged drought, sorghums go into lethargy without fading and recover vigorously as soon as the moisture returns to normal.

(To be continued).

A. HANCK

THE FORAGE PROBLEM IN THE UNION OF SOUTH AFRICA

(Concluded) *

VI. — Silage crops.

Good silage plants should have the following qualities:

(a) The crops must give a high yield in green matter and should be well adapted to the soil and climate of the area concerned, and in particular be resistant to drought and frost. Maize and sunflower are well adapted to a large part of the summer-rainfall area, are fairly drought-resistant, especially sunflowers, and give high yields. Kaffircorn (*Sorghum vulgare*) has a higher resistance to drought than maize, therefore, it can be grown together with sunflowers in localities which are too dry for maize. Sweet sorghum, pearl millet and cowpeas are other drought-resistant crops.

(b) It must be easy to grow, harvest and ensile the crop. Crops which grow slowly, compete poorly against weeds and dry out too rapidly are not recommended for silage. Maize, sunflowers, kaffircorn, sweet sorghum, pearl millet and artichoke satisfy these requirements.

(c) The plants must have thick stems, a high nutritive value, a high sugar concentration, be palatable and should not taint milk and meat; it must be possible also to use the silage crop for grain or hay.

Experiments have shown that maize is undoubtedly South Africa's most important silage crop. Maize, in fact, satisfies most of the above-enumerated requirements. The highest yields are obtained in the relatively warm and humid zones of some parts of Natal and the Transvaal. In the high-lying parts in and around Basutoland, the low temperatures often restrict yields; under such conditions, sunflowers will give higher yields. In the relatively warm and dry regions of the western Orange Free State, the drier parts of the Transvaal and certain portions of the Cape Province, the lack of moisture is a limiting factor in maize production. Under these conditions, therefore, maize is advantageously replaced

* See *Bulletin* May, June and July & August, 1940.

by kaffircorn and sunflowers. Maize is the most important silage crop under irrigation in the warm, dry parts. The production of maize for silage should not interfere with the production of maize for grain. The maize varieties which, under suitable conditions, give the highest yields for silage, are the thick-stemmed late varieties such as Sahara and Potchefstroom Pearl. But where the growing season for the silage maize is comparatively short, as in the high-lying parts of the Orange Free State and the Transvaal, it will be desirable to plant earlier varieties, such as Anveld, Wisconsin, Eksteen and Boesman. Under irrigation, preference should always be given to late varieties, because of the much higher yield obtained. The most suitable stage of growth at which maize should be harvested for silage, is when the majority of the cobs are almost ripe, but when the leaves are still green. Maize may also be harvested later provided that molasses and water are added, or harvested earlier as long as the moisture content of the plants is reduced sufficiently by wilting.

Preference is given to the sunflower in the cool parts of summer-rainfall area, and also in the semi-arid portions of the same area and on heavy soils.

Kaffircorn is planted chiefly in the semi-arid parts of the summer-rainfall area. It is unsafe to graze the after-growth of either kaffircorn or sweet sorghum. The poisonous substance which exists in the green parts of these species, however, disappears during the process of haymaking or ensilage.

Sweet sorghum and pearl millet have a high sugar concentration and are excellent to mix with other silage plants, making the addition of molasses in the silo unnecessary.

Other plants utilized for silage, although on a much smaller scale, are Sudan grass, artichokes, linseed (provided that it does not form more than 10 per cent. of the silage mass, as the plant contains a toxic substance) and buckwheat.

Annual legumes are also grown for silage, chiefly, cowpeas, soybean, dolichos bean and the velvet bean. Cowpeas and the dolichos bean are drought-resistant and are suitable for the semi-arid portions of the summer-rainfall area. The soybean should be grown in the cool moist or warm moist parts of this area, but the velvet bean may also be grown in the warm moist parts. These four legumes show little difference in yield, though preference should be given to soybean because it can be harvested more easily. These legumes have a low sugar concentration, therefore, molasses has to be added when silage is made. They give a lower yield than do maize, sunflowers and kaffircorn, and are usually more difficult to produce and also, with the exception of soybean, more difficult to harvest. On the other hand, the high protein content of these legumes will increase the nutritive value of silage. Therefore, they should preferably be mixed with maize, kaffircorn or sweet sorghum, so that 25 to 50 per cent. of the silage mass will consist of the legume.

Lucerne may be used for silage if no better use can be found. The crop should not be left until too mature, but cut at the first flowering stage and placed immediately in the silo to prevent loss in moisture content.

The successful cultivation of silage crops depends on certain factors: suitable soil types, fertilizing, soil tillage, weed eradication, planting and sowing methods.

TABLE IV. — *Particulars relating to the sowing and planting of silage crops.*

(according to I. J. SMUTS)

| Crop | Varieties recommended | Climate warm, semi-arid (Rainfall 15-23 inches) | | |
|--|---|--|------------------------|---------------------------------|
| | | Planting or sowing time | Spacing in 3 feet rows | lb. of seed required per Morgen |
| Maize ⁽¹⁾ ⁽²⁾ . . . | Sahara | not recommended | | |
| | Potchefstroom Pearl. | » | | |
| | Anveld | Mid. Dec.-mid. Jan. . | 15-30 in. | 12-20 |
| | Wisconsin | Mid. Dec.-mid. Jan. . | 15-30 in. | 8-20 |
| | American White Flint | Mid. Dec.-mid. Jan. . | 15-30 in. | 8-20 |
| | Bushman | Mid. Dec.-end. Jan. . | 15-30 in. | 6-15 |
| | Natal-8-row | Mid. Dec.-mid. Jan. . | 15-30 in. | 10-25 |
| | Eksteen | Mid. Dec.-mid. Jan. . | 15-30 in. | 8-20 |
| Sunflower ⁽³⁾ ⁽⁴⁾ . | Black Russian | January | 15-30 in. | 4-10 |
| Kaffircorn ⁽⁵⁾ ⁽⁶⁾ . | Early Red | Mid. Dec.-mid. Jan. . | 12-24 in. | 2-5 |
| Sweet Sorghum } ⁽⁷⁾ ⁽⁸⁾ | Early White | Mid. Dec.-mid. Jan. . | 12-24 in. | 2-5 |
| | Sorghum ⁽⁹⁾ . . . | Black Amber | January | sown 50-70 |
| Sudan Grass ⁽¹⁰⁾ ⁽¹¹⁾ | Only one variety . . | January | sown | 25-40 |
| Cowpeas ⁽¹²⁾ ⁽¹³⁾ . | Iron | Mid. Dec.-mid. Jan. . | 12-24 in. | 15-40 |
| | White Wonder . . . | Mid. Dec.-mid. Jan. . | 12-24 in. | 15-40 |
| Soybean ⁽¹⁴⁾ ⁽¹⁵⁾ . | Any suitable variety. | not recommended | | |
| Dolichos Bean } ⁽¹⁶⁾ ⁽¹⁷⁾ | Var. with brown seed | Mid. Dec.-mid. Jan. . | 15-30 in. | 15-40 |
| | Velvet Bean ⁽¹⁸⁾ ⁽¹⁹⁾ | Any suitable variety. | not recommended | |
| Lucerne ⁽²⁰⁾ ⁽²¹⁾ . | Provence. | March-May | sown | 40-50 |
| | Hunter River . . . | March-May | sown | 40-50 |

(¹) The best stage of growth to reap for silage is when seed is in soft to hard dough stage. — (²) Harvested by hand or with maize self-binder. — (³) Harvest when plants are in flower. — (⁴) Method of reaping as in the case of maize. — (⁵) Harvest when seed is almost ripe. — (⁶) Method of reaping same as maize. — (⁷) Harvest when seed is nearly ripe. — (⁸) Reap by hand, mower or wheat self-binder. — (⁹) Harvest when seed is nearly ripe. — (¹⁰) Harvest when seed is in soft dough stage. — (¹¹) Method of reaping as in the case of sweet sorghum. — (¹²) Harvest when first pods are ripe. — (¹³) Reap by hand. — (¹⁴) Harvest when pods are well formed. — (¹⁵) Method of reaping as in the case of sweet sorghum. — (¹⁶) Harvest when pods are well formed. — (¹⁷) Reap by hand. — (¹⁸) Harvest when pods are well formed. — (¹⁹) Reap by hand. — (²⁰) Harvest when 10 per cent. of the plants are in flower. — (²¹) Reap by hand, with mower or wheat self-binder.

TABLE IV (Continued). — Particulars relating to the sowing and planting of silage crops.

| Crop | Varieties recommended | Climate cool moist (Rainfall 23-35 inches) | | |
|--|-----------------------|---|------------------------------|---------------------------------------|
| | | Planting or sowing time | Spacing in 3 feet rows | lb. of seed required per Morgen |
| Maize ⁽¹⁾ ⁽²⁾ . . . | Sahara | not recommended | | |
| | Potchefstroom Pearl. | " " | | |
| | Anveld | End Nov.-end Dec. . | 9-18 in. | 20-50 |
| | Wisconsin | End Nov.-end Dec. . | 9-18 in. | 12-30 |
| | American White Flint | End Nov.-end Dec. . | 9-18 in. | 12-30 |
| | Bushman | End Nov.-begin. Jan. | 9-18 in. | 10-25 |
| | Natal-8-row | End Nov.-end Dec. . | 9-18 in. | 16-40 |
| | Eksteen | End Nov.-end Dec. . | 9-18 in. | 12-30 |
| Sunflower ⁽³⁾ ⁽⁴⁾ . | Black Russian . . . | January | 9-18 in. | 6-15 |
| Kaffircorn ⁽⁵⁾ ⁽⁶⁾ . | Early Red | not recommended | | |
| Sweet Sorghum } ⁽⁷⁾ ⁽⁸⁾ | Early White | not recommended | | |
| | Black Amber | not recommended | | |
| Sorghum ⁽⁹⁾ . . . | Only one variety, . | not recommended | | |
| Sudan Grass ⁽¹⁰⁾ ⁽¹¹⁾ | Iron | not recommended | | |
| Cowpeas ⁽¹²⁾ ⁽¹³⁾ . | White Wonder . . . | not recommended | | |
| | Any suitable variety | December | 3-9 in. | 25-50 |
| Dolichos Bean } ⁽¹⁶⁾ ⁽¹⁷⁾ | Var. with brown seed | December | 15-30 in. | 15-40 |
| Velvet Bean ⁽¹⁸⁾ ⁽¹⁹⁾ | Any suitable variety | not recommended | | |
| Lucerne ⁽²⁰⁾ ⁽²¹⁾ . | Provence | Recommended only for growing under irrigation; can, however, be grown in all parts of the summer rainfall area, under irrigation and on suitable soil. | | |
| | Hunter River . . . | | | |

See footnotes on p. 342.

** *Tec. 10 Engl.*

TABLE IV (Continued). — *Particulars relating to the sowing and planting of silage crops.*

| Crop | Varieties recommended | Climate warm, moist (Rainfall 23-40 inches) | | |
|--|-----------------------|---|------------------------------|---------------------------------------|
| | | Planting or sowing time | Spacing in 3 feet rows | lb. of seed required per Morgen |
| Maize ⁽¹⁾ ⁽²⁾ . . | Sahara. | Mid. Dec.-mid. Jan. . | 9-18 in. | 20-50 |
| | Potchefstroom Pearl. | Mid. Dec.-mid. Jan. . | 9-18 in. | 20-50 |
| | Anveld | End Dec.-end Jan. . | 9-18 in. | 20-50 |
| | Wisconsin | End Dec.-end Jan. . | 9-18 in. | 12-30 |
| | American White Flint | End Dec.-end Jan. . | 9-18 in. | 12-30 |
| | Bushman | End Dec.-begin. Feb. | 9-18 in. | 10-25 |
| | Natal-8-row | End Dec.-end Jan. . | 9-18 in. | 16-40 |
| | Eksteen | End Dec.-end Jan. . | 9-18 in. | 12-30 |
| Sunflower ⁽³⁾ ⁽⁴⁾ . | Black Russian . . . | Begin. Jan.-mid. Feb. | 9-18 in. | 6-15 |
| Kaffircorn ⁽⁵⁾ ⁽⁶⁾ . | Early Red | not recommended | | |
| Sweet Sorghum } ⁽⁷⁾ ⁽⁸⁾ | Early White | not recommended | | |
| | | | | |
| Sorghum ⁽⁹⁾ . . | Black Amber | Begin. Jan.-mid. Feb. | sown | 50-70 |
| Sudan Grass ⁽¹⁰⁾ ⁽¹¹⁾ | Only one variety . . | non recommended | | |
| Cowpea ⁽¹²⁾ ⁽¹³⁾ . | Iron | Begin. Jan.-mid. Feb. | 9-18 in. | 25-50 |
| | White Wonder . . . | Begin. Jan.-mid. Feb. | 9-18 in. | 25-50 |
| Soybean ⁽¹⁴⁾ ⁽¹⁵⁾ . | Any suitable variety. | January | 3-9 in. | 25-50 |
| Dolichos Bean } ⁽¹⁶⁾ ⁽¹⁷⁾ | Var. with brown seed | January | 15-30 in. | 15-40 |
| | | | | |
| Velvet Bean ⁽¹⁸⁾ ⁽¹⁹⁾ | Any suitable variety. | Mid. Dec.-end Jan. . | 24-36 in. | 15-40 |
| Lucerne ⁽²⁰⁾ ⁽²¹⁾ . | Provence. | Recommended only for growing under irrigation; can, however, be grown in all parts of the summer rainfall area, under irrigation and on suitable soil. | | |
| | Hunter River . . . | | | |

TABLE IV (Concluded). — *Particulars relating to the sowing and planting of silage crops.*

| Crop | Varieties recommended | Irrigation (5-23 in.) | | |
|---|--|--|-------------------------|---------------------------------|
| | | Planting or sowing time | Planting in 3 feet rows | lb. of seed required per Morgen |
| Maize ⁽¹⁾ ⁽⁸⁾ . . . | Sahara | Begin. Dec.-mid. Jan. | 9-18 in. | 20-50 |
| | Potchefstroom Pearl. | Begin. Dec.-mid. Jan. | 9-18 in. | 20-50 |
| | Anveld | Mid. Dec.-mid. Jan. | 9-18 in. | 20-50 |
| | Wisconsin | Mid. Dec.-mid. Jan. | 9-18 in. | 12-30 |
| | American White Flint | Mid. Dec.-mid. Jan. | 9-18 in. | 12-30 |
| | Bushman | Mid. Dec.-end Jan. | 9-18 in. | 10-25 |
| | Natal-8-row | Mid. Dec.-mid. Jan. | 9-18 in. | 16-40 |
| | Eksteen | Mid. Dec.-mid. Jan. | 9-18 in. | 12-30 |
| Sunflower ⁽³⁾ ⁽⁴⁾ . | Black Russian . . . | Begin. Jan.-mid. Feb. | 9-18 in. | 6-15 |
| Kaffircorn ⁽⁵⁾ ⁽⁶⁾ . | Early Red | not recommended | | |
| Sweet Sorghum ⁽⁷⁾ ⁽⁸⁾ } | Early White | not recommended | | |
| Sorghum ⁽⁹⁾ . . . | Black Amber | Begin. Jan.-mid. Feb. | sown | 50-70 |
| Sudan Grass ⁽¹⁰⁾ ⁽¹¹⁾ | Only one variety . . | not recommended | | |
| Cowpeas ⁽¹²⁾ ⁽¹³⁾ . | Iron | Begin. Jan.-mid. Feb. | 9-18 in. | 25-50 |
| | White Wonder | Begin. Jan.-mid. Feb. | 9-18 in. | 25-50 |
| Soybean ⁽¹⁴⁾ ⁽¹⁵⁾ . | Any suitable variety | January | 3-9 in. | 25-50 |
| Dolichos Bean ⁽¹⁶⁾ ⁽¹⁷⁾ } | Var. with brown seed | January | 15-30 in. | 15-40 |
| Velvet Bean ⁽¹⁸⁾ ⁽¹⁹⁾ | Any suitable variety | not recommended | | |
| Lucerne ⁽²⁰⁾ ⁽²¹⁾ . | Provence Hunter River | Recommended only for growing under irrigation; can, however, be grown in all parts of the summer rainfall area, under irrigation and on suitable soil. | | |

See footnotes on p. 342.

TABLE V. — *Composition, digestibilit*

| Crop | Composition | |
|--|-------------|-----|
| | Water | Ash |
| <i>Maize:</i> | | |
| Grain, dent | 12.8 | 1.4 |
| Grain, flint | 11.5 | 1.5 |
| Stalks reaped when dry | 9.4 | 5.8 |
| <i>Fresh succulent feeds, suitable for silage:</i> | | |
| Maize, dent, flowering stage | 85.1 | 1.1 |
| Maize, dent, seeds in milk stage | 80.1 | 1.1 |
| Maize, dent, seeds ripe | 65.2 | 1.4 |
| Maize, flint, flowering stage | 89.4 | 0.8 |
| Maize, flint, seeds milky stage | 85.0 | 0.8 |
| Maize, flint, seeds ripe | 72.1 | 1.3 |
| Maize stalks, green cobs reaped | 77.3 | 1.4 |
| Kaffircorn | 76.4 | 1.9 |
| Sweet sorghum | 75.1 | 1.4 |
| Sunflower, flowering stage | 83.4 | 1.7 |
| Sudan grass | 77.5 | 1.6 |
| Barley | 76.8 | 2.1 |
| Oats | 73.9 | 2.1 |
| Rye | 78.7 | 1.7 |
| Lucerne, pre-flowering stage | 80.1 | 2.3 |
| Lucerne in flower | 74.1 | 2.5 |
| Lucerne, after flowering | 70.2 | 2.2 |
| Cowpeas | 83.7 | 2.0 |
| Soybean, in flower | 79.2 | 2.3 |
| Soybean, in seed | 75.8 | 2.4 |
| Velvet bean | 82.1 | 2.0 |
| Dolichos bean, in flower | 80.6 | 2.3 |
| <i>Silage:</i> | | |
| Maize thoroughly mature | 73.7 | 1.7 |
| Maize, immature | 79.0 | 1.4 |
| Maize from dry stalks | 79.4 | 1.3 |
| Kaffircorn | 69.2 | 2.5 |
| Sweet sorghum | 77.2 | 1.6 |
| Barley | 75.0 | 2.6 |
| Oats | 71.7 | 1.9 |
| Rye | 73.1 | 2.2 |
| Sudan grass | 74.7 | 1.8 |
| Sunflower | 78.1 | 2.2 |
| Lucerne, unwilted | 75.0 | 3.2 |
| Cowpeas | 78.8 | 2.3 |
| Soybean | 72.8 | 3.5 |
| Velvet bean | 76.4 | 1.1 |

and yield of succulent feeds.

| in percentage | | | | Total digestible nutrients | Yield in lb. per Morgen | |
|------------------|-------|-----------------------|-----|----------------------------------|-------------------------|-------------------------------|
| Crude protein | Fibre | Starch Sugar, etc. | Fat | | Crude material | Total digestible nutrients |
| 9.6 | 2.3 | 70.0 | 3.9 | 82.5 | 2000-8000 | 1650-6600 |
| 9.8 | 1.9 | 71.0 | 4.3 | 84.1 | 2000-6000 | 1682-5046 |
| 5.9 | 30.8 | 46.5 | 1.6 | 52.2 | 6000-16000 | 3132-8352 |
| 1.6 | 4.3 | 7.6 | 0.3 | 10.0 | 10000-60000 | 1000-6000 |
| 1.6 | 4.9 | 11.7 | 0.6 | 14.2 | 20000-70000 | 2840-9940 |
| 2.7 | 7.4 | 22.3 | 1.0 | 24.4 | 30000-90000 | 7320-21960 |
| 1.4 | 3.2 | 4.8 | 0.4 | 7.1 | 10000-50000 | 710-3550 |
| 1.5 | 3.6 | 8.6 | 0.5 | 10.7 | 20000-60000 | 2140-6420 |
| 2.4 | 6.1 | 17.0 | 1.1 | 19.4 | 15000-80000 | 5820-15520 |
| 1.3 | 6.0 | 13.6 | 0.4 | 12.9 | 10000-50000 | 1290-6450 |
| 2.4 | 6.6 | 12.0 | 0.7 | 14.4 | 20000-60000 | 2880-8640 |
| 1.5 | 7.0 | 14.0 | 1.0 | 17.1 | 20000-60000 | 3420-10260 |
| 1.4 | 4.8 | 8.1 | 0.6 | 9.3 | 20000-100000 | 1860-9300 |
| 1.8 | 7.5 | 10.9 | 0.7 | 13.5 | 20000-40000 | 2750-5500 |
| 3.3 | 6.0 | 11.0 | 0.8 | 14.7 | 20000-40000 | 2940-5880 |
| 3.2 | 7.8 | 11.9 | 1.1 | 15.9 | 20000-50000 | 3180-7950 |
| 2.6 | 7.3 | 9.0 | 0.7 | 15.4 | 20000-40000 | 3080-6160 |
| 4.7 | 4.2 | 7.9 | 0.8 | 11.7 | 30000-60000 | 3510-7020 |
| 4.4 | 7.8 | 10.4 | 0.8 | 14.8 | 40000-80000 | 5920-11840 |
| 2.9 | 12.8 | 11.3 | 0.6 | 16.0 | 40000-80000 | 6400-12800 |
| 3.0 | 3.8 | 7.0 | 0.5 | 11.0 | 20000-50000 | 2200-5500 |
| 3.9 | 5.8 | 8.2 | 0.6 | 12.2 | 20000-40000 | 2440-4880 |
| 4.0 | 6.4 | 10.4 | 1.0 | 14.9 | 20000-50000 | 2980-7450 |
| 3.5 | 5.1 | 6.6 | 0.7 | 10.8 | 20000-50000 | 2160-5400 |
| 2.8 | 5.7 | 8.0 | 0.6 | — | 20000-50000 | — |
| 2.1 | 6.3 | 15.4 | 0.8 | 17.7 | | |
| 1.9 | 5.8 | 11.3 | 0.6 | 13.3 | | |
| 1.5 | 6.8 | 10.5 | 0.6 | 12.2 | | |
| 1.8 | 9.9 | 15.5 | 1.1 | 17.5 | | |
| 1.5 | 6.9 | 11.9 | 0.9 | 13.3 | | |
| 2.6 | 9.4 | 9.4 | 1.0 | 15.8 | | |
| 2.0 | 9.8 | 13.3 | 1.3 | 17.3 | | |
| 3.3 | 9.6 | 11.0 | 0.8 | 19.4 | | |
| 2.4 | 8.6 | 11.8 | 0.7 | 15.1 | | |
| 2.0 | 6.4 | 10.2 | 1.1 | 12.6 | | |
| 3.9 | 8.8 | 7.5 | 1.6 | 13.2 | | |
| 3.1 | 6.1 | 8.9 | 0.8 | 12.6 | | |
| 4.2 | 7.9 | 10.7 | 1.5 | 15.6 | | |
| 4.3 | 8.0 | 9.0 | 1.2 | 15.0 | | |

The yield and quality of green forage depends largely on the extent to which these factors are taken into account. The foregoing tables (IV and V) summarize the chief facts on the planting and sowing of silage crops and indicate the composition, digestibility and yield of the principal fresh or ensiled fodders, clearly showing the differences found and the advantages of ensilage. These tables are based on the results obtained by SMUTS, MORRISON and others.

Utilization of grasses for hay or after artificial drying.

The advantage of utilizing veld grasses for hay is twofold: a reserve stock is obtained for use in periods of low veld production, and most important, the excess grass is removed, promoting good growth renewal, without having to burn the veld.

Quality in hay depends far more on the stage of growth at which the grass is cut and on the manner in which it is cured than on climatic conditions. The best hay is that prepared rapidly and exposed as little as possible to the sun. Experiments have shown that the best cutting period is every two months when the phosphorus and protein content of the grass is highest. There is an advantage in cutting the grass fairly close to the ground, but, however, this practice leaves the soil bare and should only be adopted when rapid refoliation is assured. When grass is cut late in the season, there is very little after-growth to protect the soil.

There are no special methods of haymaking. Stock-farmers avoid exposing the hay to unfavourable conditions in the high-rainfall areas and carry out drying as rapidly as possible.

In recent years, attention has been given in the Union to the artificial drying of herbage. The dried fodder is pressed into cakes or ground into meal. It is claimed that the finished product supplies cattle with protein, lime, phosphoric acid, chlorine and the necessary vitamins in a better form than that which can be obtained from oil-cake. The protein content varies from 15 to 20 per cent., depending on time of cutting the grass and its stage of growth. Dry grass can be substituted for oil-cake for fattening cattle and sheep. Unfortunately, the cost of artificial drying is fairly high and varies according to the moisture content of the grass; in South Africa, however, costs would be less as labour is cheap and the grass has a lower moisture content. *Paspalum dilitatum* and kikuyu would appear, under good conditions, to be the most suitable grasses.

Experiments on the use of grass as hay have shown that very satisfactory results can be obtained from teff (*Eragrostis teff*), introduced into the Transvaal by Dr BURTT DAVY in 1923, and Rhodes grass. Legumes, in particular lucerne and cowpeas, also furnish excellent hay.

Lucerne and teff are the principal forage plants now used in haymaking, and used as a feed for cattle, especially milch cows. The annual production of lucerne and teff hay varies considerably, but is never lower than 150,000 and 100,000 tons respectively. Comparative experiments were carried out at the Faculty of Agriculture at the Pretoria University on the digestibility of

lucerne and teff hay for cattle. The results obtained are summarized in the following table:

TABLE VI. — *Digestible nutrients of lucerne and teff hay.*

| | Total dry matter | Digestible nutrients | | | | Total digestible nutrients | Nutritive ratio (%) |
|-----------------------|------------------|----------------------|-----|-------------|-----------------------|----------------------------|---------------------|
| | | Crude protein | Fat | Crude fibre | Nitrogen-free extract | | |
| | | % | % | % | % | | |
| Teff hay | 92.2 | 4.6 | 0.6 | 22.7 | 28.0 | 56.6 | 1 : 11.3 |
| Lucerne hay | 91.3 | 12.8 | 0.5 | 12.9 | 27.6 | 54.4 | 1 : 3.2 |

(*) Nutritive ratio = the ratio of digestible crude protein to balance of total digestible nutrients.

The above table shows that teff and lucerne hay are practically the same as regards total digestible nutrients, but differ considerably in nutritive ratio, owing to the higher content of lucerne hay in digestible protein.

Conclusions.

Improved veld management and artificial grasslands as yet cannot furnish enough stockfeed throughout the year, even under highly favourable conditions. It is necessary, therefore, to have reserve stocks obtained from other sources to supplement the insufficient forage production. Some of these reserve feeds could be obtained from the grasslands themselves by utilizing the excess herbage not grazed by the animals, either for hay or silage. To have any real nutritive value, however, the herbage should be cut well before full growth.

Veld management in the Karroo.

It is only during the past few years that the importance of efficient pasture management in the Karroo has been fully realized. Experiments carried out at Fauresmith and Grootfontein have shown that the Karroo possesses plants that are equal to the best forage plants in the world. These plants are very resistant to drought, have a high nutritive value and are eagerly grazed at all seasons. The best pasture plants on any given area of the veld are indicated by the grazing animal, and no matter what their botanical name or chemical composition might be, are worth while protecting. The policy to be followed, therefore, is not to introduce new species, but to protect and propagate desirable indigenous species, and control grazing by keeping stock in different camps at different periods.

The most urgent problem is the restoration of the vegetal covering of the denuded areas of the Karroo. Under ordinary conditions it will take a number

of years for the vegetation to be restored. It is possible, however, to restore the vegetal covering more quickly by sowing the seed of suitable karroo species, which germinate readily. Experiments have shown that suitable plants are *Tetragonia arbuscula* (klappiesbrak), *Trypteris pachypteris* (rivierdraaibos), *Pentzia incana* (ankerkarro), *Eragrostis bergiana* (kwaggakweek). Every farmer should make a personal study of the vegetation on his farm and decide for himself which plants are the most suitable for the purpose.

In brief, it may be affirmed from past experiments that veld restoration and efficient pasture management in the Karroo can only be brought about by concentrating on the native species and by close co-operation of a zealous farming community.

Plants poisonous to stock.

A review, even if brief, of the forage problem in the Union of South Africa would be incomplete without mention of the problems of plant poisoning in stock. These plants are responsible for enormous stock losses every year. In South Africa, there are about two hundred known poisonous plants, of which the following are the most dangerous: *Dichapetalum cymosum* (gifblaar); different species of *Geigeria* (vermeerbossies); *Urginea burkei* (Transvaal slangkop); *Pachystigma pygmaeum* (gousiektebossie); different species of *Senecio* and *Cotelydon*. There is also a number of plants which may be considered as good stock-feed, but which, under certain conditions become toxic and cause heavy losses, for example, several grasses when wilted.

In order that stock-breeders may become familiar with the principal dangerous species, specimens are placed on view at all agricultural shows, and farmers may apply directly to the chief of the Division of Plant Industry at Pretoria for advice on the control of these plants. The methods now employed by the qualified Services of the Department of Agriculture, if scrupulously carried out, would appear to be effective in eliminating this danger to stock.

J. LEGROS

Publications consulted:—

- BARENBRUG, Theo. H., Veld-improvement. Seed production, Seed testing. *South African Journal of Science*, Johannesburg, 1935, Vol. XXXII, pp. 257-267.
- BOTHA, J. P., Pasture management in the Karroo. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 127, pp. 420 and 427.
- BOTHA, J. P., The digestibility and nutritive value of Karroo pasture plants, *Farming in South Africa*, Pretoria, 1938, Vol. XIII, No. 143, pp. 63-65.
- BREDA, N. G. van, A method of charting Karroo vegetation. *South African Journal of Science*, Johannesburg, November, 1937, Vol. XXXIV, pp. 265-267.
- CLEGHORNE, W. S. H., Veld reclamation: an example at Grootfontein. *South African Journal of Science*, Johannesburg, October, 1932, Vol. XXIX, pp. 185-191.

- COETZEE, P. J. S., Veld management in the Karroo. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 124, pp. 285-286.
- FISHER, J., Establishment and management of pastures. *Farming in South Africa*, Pretoria, 1932, Vol. VII, No. 78, pp. 241-243 and 258.
- FISHER, J., Grasses for pastures in Natal. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 120, pp. 97-98.
- GILL, Geo. A., Grass mixtures. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 95, p. 48.
- GILL, Geo. A., Veld-burning experiments. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 121, p. 134.
- GILL, Geo. A., Renovation of artificial pastures. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 123, p. 232.
- GLOVER, P. E., Some hints on the determination of certain highveld grasses vegetatively. *South African Journal of Science*, Johannesburg, March, 1937, Vol. XXXIII, pp. 443-500.
- GLOVER, P. E., A contribution to the ecology of the highveld flora. *South African Journal of Science*, Johannesburg, November, 1937, Vol. XXXIV, pp. 224-259.
- GOOSSENS, A. P. and STAPELBERG, W. J., A brief note on the macroscopic aspect of some western Transvaal grasses. *South African Journal of Science*, Johannesburg, October, 1933, Vol. XXX, pp. 212-219.
- GOOSSENS, A. P. et THERON, J. J., An anatomical study of *Themeda triandra* Forsk. *South African Journal of Science*, Johannesburg, November, 1934, Vol. XXXI, pp. 254-278.
- IRVINE, L. O. F., The ecology of the northern Transvaal in relation to agriculture. *South African Journal of Science*, Johannesburg, March, 1937, Vol. XXXIII, pp. 639-642.
- HALL, Thos. D., Intensive grazing on veld. *South African Journal of Science*, Johannesburg, November, 1931, Vol. XXVIII, pp. 202-204.
- HALL, Thos. D., Intensive grazing on veld-II. *South African Journal of Science*, Johannesburg, October, 1932, Vol. XXIX, pp. 389-413.
- HALL, Thos. D., The botanical composition of exotic pastures in South Africa. *South African Journal of Science*, Johannesburg, 1935, Vol. XXXII, pp. 197-204.
- HALL, Thos. D., The botanical analysis of intensively grazed pastures. *South African Journal of Science*, Johannesburg, 1935, Vol. XXXII, pp. 189-196.
- HALL, Thos. D., and MEREDITH, D., Intensive grazing on veld-IV: The effect of rotational grazing and fertilising on veld over a six-year period. *South African Journal of Science*, Johannesburg, March, Vol. XXXIII, 1937, pp. 404-430.
- HALL, Thos. D., MEREDITH, D. and MURRAY S. M., The productivity of fertilised natural high-veld pastures. *South African Journal of Science*, Johannesburg, November, 1937, Vol. XXXIV, pp. 275-285.
- HENNING, P. D., The latest methods of silage-making. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 122, pp. 199-201.
- HENRICI, M., Grass or bush in the Karroid area? *South African Journal of Science*, Johannesburg, November, 1931, Vol. XXVIII, p. 266.

- HENRICI, M., South African pastures: their mineral and protein content. *Farming in South Africa*, Pretoria, 1932, Vol. XII, No. 78, pp. 245-248.
- HENRICI, M., Carrying capacity and tests of palatability of Karroo bushes. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 95, pp. 53-55.
- HENRICI, M., The veld reserve at Fauresmith. *Farming in South Africa*, Pretoria, 1934, vol. IX, No. 103, pp. 400-402.
- HENRICI, M., The chemical composition of grass veld. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 113, pp. 345 and 348.
- HENRICI, M., Germination of Karroo bush seeds. *South African Journal of Science*, Johannesburg, 1935, Vol. XXXII, pp. 223-234.
- HENRICI, M., Fodder plants of the broken veld. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 120, p. 101.
- LANGENEGGER, O. A., Grazing in the Kingwilliamstown area. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 125, p. 341.
- LEIBBRANDT, F. E. A., Protein content of grasses. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 103, p. 399.
- LIEBENBERG, C. D. B. Botanical survey of the South-Eastern Area. *Farming in South Africa*, Vol. X, No. 108, Pretoria, 1935, pp. 123-124.
- LINDSAY ROBB, R., Grassland development in South Africa. Present position and future possibilities. University of Pretoria. Series No. 1, Agriculture-Bulletin No. 35, Pretoria, 1936, 43 pp., 2 fig., 1 map.
- MARAIS, A., Permanent grass pastures *versus* crop farming. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 107, pp. 71-72 and 74.
- MARAIS, A., Grazing in the Elliot-Maclear Area. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 121, p. 144.
- MARAIS, J. S., Dryland lucerne in the winter rainfall area. *Farming in South Africa*, Pretoria, 1932, vol. VII, No. 78, pp. 255-256.
- MARAIS, J. S., Succulent feeds for the winter rainfall area. *Farming in South Africa*, Pretoria, 1932, Vol. VII, No. 79, pp. 279-280 and 288.
- MARAIS, J. S., Drought resistant fodder crops. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 113, pp. 340 and 352.
- MOSES, D., Experiments with improved pastures in the coastal belt: production under intensive management. *South African Journal of Science*, Johannesburg, November, 1931, Vol. XXXI, pp. 299-314.
- MOSES, D. Experiments with improved pastures in the coastal belt: preliminary report. *South African Journal of Science*, Johannesburg, October, 1932, Vol. XXIX, pp. 375-377.
- MOSES, D. and DEENIK, Z., The botanical survey of intensively grazed veld. *South African Journal of Science*, Johannesburg, October, 1933, Vol. XXX, pp. 317-323.
- PARISH, E., Pastures. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 97, pp. 131-132.
- PENTZ, J. A., South African pasture grasses together with a survey of the work on Priushof Pasture Experiment Station. Department of Agriculture and Forestry Division of Plant Industry, Pretoria, 1935, Series No. 6, Bull. No. 148, 28 pp., 11 fig.

- PHILLIPS, E. P., South African grasses with notes on their structure, distribution, cultivation, etc. South African Agricultural Series, Vol. 6, Central News Agency, Ltd. South-Africa, Pretoria, 1931, 224 pp., 121 plates.
- PHILLIPS, E. P., Grasses. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 120, pp. 105-106.
- POLE EVANS, I. B., The Union as a pastoral country. *Farming in South Africa*, Pretoria, 1932, Vol. VII, No. 78, pp. 233-236 and 263.
- PULLEN, A. R., New varieties of teff, *Eragrostis Teff* (Zucc.) Trotter. *South African Journal of Science*, Johannesburg, 1935, Vol. XXXII, pp. 268-270.
- RENSBURG, C. J. J. van. Woolly Finger grass on Rietondale Experiment Station. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 107, pp. 49-50.
- ROSS, J. C., BOSMAN, A. M. and WYK, L. P. van, Digestibility of teff hay, maize, oil cake and lucerne hay for cattle. University of Pretoria. Faculty of Agriculture, Bulletin No. 20, Pretoria, 1931, 23 pp., 4 fig.
- ROWLAND, J. W., Notes on the study of plant succession in relation to grazing. *South African Journal of Science*, Johannesburg, October, 1933, Vol. XXX, pp. 307-316.
- ROWLAND, J. W., The grazing of veld. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 103, pp. 383-385.
- ROWLAND, J. W., Aims and technique of sourveld management experiments. *South African Journal of Science*, Johannesburg, March, 1937, Vol. XXXIII, pp. 616-616.
- ROWLAND, J. W., Grazing management. Department of Agriculture and Forestry. Bulletin No. 168 (Division of Plant Industry, Series No. 12), Pretoria, 1937, 26 pp.
- ROWLAND, J. W. and HECTOR J. M., Pastures studies, I. A preliminary analysis of the grazing conditions on a Potgietersrust farm. *South African Journal of Science*, Johannesburg, October, 1932, Vol. XXIX, pp. 338-330.
- SAUNDERS, A. R., Reclamation of witchweed-infested lands by planting grasses. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 120, pp. 96 and 127.
- SCHOLTZ, B. P., Lucerne cultivation. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 97, p. 141.
- SCHULTZ, W., Methods of harvesting silage crops and filling of silos. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 124, p. 286.
- SCOTT, J. D., Some problems in the restoration of veld. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 108, pp. 103-105.
- SCOTT, J. D., The possibilities of reseeding damaged veld and old lands. *South African Journal of Science*, Johannesburg, March, 1937, Vol. XXXIII, pp. 617-624.
- SEYMORE, D. J., The reclamation of bushveld farms. *Farming in South Africa*, Pretoria, 1939, Vol. XIV, No. 156, pp. 85-88, 9 fig.
- SMIT, N. L., Rhodes grass for the reclamation of old lands. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 125, pp. 319-320 and 348.
- SMITH, F. C., Vetches for the coastal areas. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 107, p. 83.
- SMITH, F. C., Pastures in the coastal area of the South Eastern Cape Province. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 123, p. 230.

- SMUTS, I. J., Silage, silos and silage crops. Department of Agriculture and Forestry Extension, Pretoria, 1938, Series No. 19, *Bulletin* No. 181, 51 pp., 15 fig.
- STAPLES, R. R., Experiments in veld management, First Report. Department of Agriculture, Pretoria, 1926, Science Bulletin No. 49, 35 pp., 13 fig., 5 plates.
- STEYN, Douw G., Plant poisoning in stock. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 127, p. 430.
- TAYLOR, A. J., Composition of intensive pastures and the influence of fertilizers upon them. *Farming in South Africa*, Pretoria, 1931, Vol. VII, No. 78, pp. 249-251.
- TAYLOR, A. J., Minerals in pastures. *Farming in South Africa*, Pretoria, 1932, Vol. VII, No. 79, pp. 273-275.
- TAYLOR, A. J., Pasture management: close clipping and manuring of grasses. *Farming in South Africa*, Pretoria, 1933, Vol. VIII, No. 82, pp. 27-28.
- TAYLOR, A. J., Studies in pasture management: a further report on the seasonal composition of certain South African pasture grasses in relation to their manuring and intensity of grazing. *South African Journal of Science*, Johannesburg, November, 1931, Vol. XXVIII, pp. 205-206.
- THERON, G. C., Veld-burning in the Western Transvaal. *Farming in South Africa*, Pretoria, 1932, Vol. VII, No. 78, pp. 244 and 254.
- THERON, G. C., Veld management investigations at the School of Agriculture, Potchefstroom, Department of Agriculture. Preliminary Report. Pretoria, 1937. Bulletin No. 166 (Extension Series No. 7).
- THOMPSON, W. R., Veld burning: its history and importance in South Africa University of Pretoria, Pretoria, 1936, Series No. 1, 31 19 pp.
- TOIT, A. G. S. du, Pasture management in Natal and East Griqualand. *Farming in South Africa*, Pretoria, 1931, Vol. V, No. 58, pp. 483-484 and 500.
- TOIT, A. G. S. du, Artificially dried grass. *Farming in South Africa*, Pretoria, 1938, Vol. XIII, No. 143, pp. 53-54.
- TOIT, A. G. S. du, Haymaking in high-rainfall areas. *Farming in South Africa*, Pretoria, 1938, Vol. XIII, No. 143, pp. 61-62.
- TOIT, A. G. S., du, The value of pastures. *Farming in South Africa*, Pretoria, 1938, Vol. XIII, No. 143, pp. 51-52.
- TOIT, E. du, Veld improvement by means of contour banking. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 103, p. 410.
- TOIT, J. J. du, Importance of fodder crops rich in proteins. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 110, pp. 211-212.
- TOIT, R. du, Protecting the pasture against wind-blown sea sand. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 103, pp. 403-404.
- TOIT, R. du, Pastures in the Humansdorp-Langkloof area. *Farming in South Africa*, Pretoria, 1936, Vol. XI, No. 122, p. 201.
- TURPIN, H. W. and MARAIS, J. G., Maize for silage under irrigation in the Karroo. *Farming in South Africa*, Pretoria, 1931, Vol. V, No. 58, pp. 491-493.
- TURPIN, H. W. MCKELLAR, D. W., SMIT, B. and GRILL, Geo., Lucerne in South Africa. Department of Agriculture and Forestry, Pretoria, 1936, Bull. No. 170, 88 pp., 32 fig.

- VILLIERS, S. R. de, The trend of pasture research, with special reference to breeding. *Farming in South Africa*, Pretoria, 1934, Vol. IX, No. 103, pp. 386-388.
- VOORENDYK, J. J., Planting trees for special purposes. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 108, pp. 108-109 and 118.
- VUREN, J. P. J. van., Management of sourveld and early pastures. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 107, pp. 52 and 90.
- WYK, N. J. van, The fodder problem in Western Transvaal. *Farming in South Africa*, Pretoria, 1930, Vol. V, pp. 73-75.
- WYK, H. P. D., van, Legumes for milk production. *Farming in South Africa*, Pretoria, 1935, Vol. X, No. 113, p. 325.
- GRASSLAND RESEARCH COMMITTEE. The grasslands of South Africa. Problems and possibilities. University of Pretoria, Pretoria, 1932, Series 1, No. 23, 50 pp.
- Pasture research in South Africa. Department of Agriculture and Forestry, Progress Report No. 1, Pretoria, 1938, 161 pp., 38 fig.

THE PROBLEM OF MALNUTRITION AS REGARDS THE RURAL POPULATION OF EUROPE

(Concluded) *

Considerable difficulties are always encountered in the making of dietetic surveys and most of these when carried out in rural areas have so far been incomplete, the results obtained being all too often of such a nature as to make comparison with similar surveys impossible.

Many surveys have been made dealing exclusively with diet, others have been confined to a study of nutrition conditions. Even when only partial, these surveys are very important in establishing actual facts or forming physiological conclusions.

General considerations concerning diet of the rural population in various European countries prior to the outbreak of hostilities.

In Germany, systematic studies concerning the diet of small farmers began in 1931; exhaustive surveys (Prof. SCHEUNERT and his collaborators, carried out on a large number of people of varying age and occupation at different seasons proved that in many districts the calorific value amounted to an average of 3,790 units per day and came very close to the 4,000 calories which theoretically should be the amount available during intense work. The numerous investigations concerning the diet of the farming population show that in Germany this is well balanced from the standpoint both of quantity and quality.

* See *Bulletin* September, 1940.

In Bulgaria, the average consumption of the peasant is about 3,400 calories; this is insufficient during the period of heavy field work, such as harvesting, etc. The diet is as a rule monotonous and consists mainly of bread; an average of 72 per cent. of energizing food is supplied by flour. Very little meat is eaten, this food generally being served as a rule only once or twice a week. Ordinary bread is usually made of brown or wholemeal flour consisting of a mixture of wheat and rye flours; in some of the mountain regions the bread is made of rye flour with the addition of barley and potato flour. Maize is eaten in the form of bread and not as polenta.

In France, as in many other countries, account must be taken of the wide difference between the various regions. Generally speaking the consumption of bread has decreased, while that of meat has increased; the agricultural depression increased consumption among rural populations, as farmers refused to sell their produce at excessively low prices. A considerable increase has been observed in the consumption of dairy produce and fresh fruit. The diet has become much better in quality, more varied and more rational. Consumption of wine and beer has fallen off considerably, while as a rule if the worker does not drink to excess, he eats more and is more particular about the type of food eaten.

In Greece, the general diet of the peasant is of typical simplicity, with bread as the basic food. Beans rank second in importance as an article of diet. Very little meat is eaten, being considered as a luxury, reserved only for great occasions. Milk is given only to tiny children.

In Hungary, the basic food is also bread, eaten at every meal and as a rule supplying some 50 per cent. of the energizing element in the diet. Paprika and raw tomatoes are an important addition. Very little milk is consumed and the poor peasant rarely eats meat more than once or twice a week. Eggs, butter and poultry are also rare except on holidays.

Even the consumption of bread is insufficient to supply the necessary calories, except among the richer peasants, who eat between 750 and 1000 grams of bread daily.

In Italy, statistics supplied by the Central Statistical Institute show that the daily calory requirement of an average man was 2,985 calories during the pre-war period 1910-1914; a considerable improvement has taken place during the past few years, 3,291-3554 calories being the usual amount nowadays. A similar improvement has taken place in regard to proteins, fats and carbohydrates.

Taking as a basis the physiological composition of a 'proper diet', as determined by Prof. BORRAZZI (100 grams of proteinic substances, 75 grams of fats, 450 grams of carbohydrates), the average Italian diet prior to the outbreak of hostilities (108 gr. of proteins, 71 gr. of fats, 537 gr. of carbohydrates) showed only a negligible deficiency in fats which - given the special climatic conditions - offers no cause whatever for alarm. A decrease in consumption of maize and rice has been observed in the agricultural areas (Piedmont, Lombardy, Venetia and

Emilia), where the rural classes, whose diet was formerly very monotonous, have now adopted one offering a wider variety of foods which is consequently more healthy from the physiological standpoint.

The increased consumption of animal foods, with the exception of salted and processed meats, poultry and game, offers clear evidence of the progress registered in Italy. The consumption of milk and butter which is being used more and more in place of other fats used traditionally is also on the upward trend.

The importance of an improved diet is clearly demonstrated by the progressive decline in the death rate during the past few years.

In Latvia, the diet of the peasant classes is as a rule very simple. The considerable increase in agricultural production during the past few years has led to a higher consumption of certain foodstuffs, while the extension of the area sown to wheat has affected consumption of this product. Consumption of whole milk, beef and pig meat, eggs and honey has also registered an increase in the country districts. On the other hand, a decline in the consumption of sugar and herrings has been observed, the peasant eating less of these foods since they have to be purchased.

In Poland, rye bread was the typical bread used by the rural population. Well-to-do peasants sometimes add a certain quantity of white wheat flour or else have their rye bolted at 65 per cent., but this practice is not very common. Throughout the greater part of the country white bread is made only three or four times a year, in honour of fête-days. Bread and other cereal foods form at least 60 per cent. of the peasants' diet, followed by potatoes, more of which are consumed in Poland than in any other European country. Very little meat and animal fats are consumed; colza or sunflower oil are the most commonly used. During the past few years the diet has greatly improved, while an increased consumption of milk and cheese has been observed in several regions.

In Romania, the principal cereals consumed are maize and wheat and the peasants' diet is often very mediocre. Their meals consist of maize boiled in water, making a kind of thick soup which is eaten hot and called 'mamaliga'. The rest of their diet is composed chiefly of small quantities of green and root vegetables, beans and cheese; very little meat is eaten.

In Yugoslavia, the peasants' diet is very much the same as in other Balkan countries; bread and other foods made from cereals constituting the essential part of their diet. Naturally the diet varies considerably according to the season and the different parts of the country.

Consumption of bread. — Cereals are the most economical form of energizing foods and are the basis of the diet in the great majority of peasant homes.

They often supply from 80 to 90 per cent. of the energizing value of the diet in Central, Eastern and South-Eastern Europe.

Bread is cheaper than any other food and its proteins are extremely important. In Germany and Scandinavia, wheat and rye bread are eaten in almost equal proportions. In the Baltic States and Poland, rye bread is more commonly used. In Western Europe (France, Belgium, Great Britain, Spain, the Netherlands, Switzerland and Portugal, bread is usually made from wheat flour; the same may be said for the Basin of the Danube, the greater part of Bulgaria, Greece and Turkey.

Although when planning a balanced diet the first step is to reduce the consumption of bread, it should nevertheless be recalled that good bread is an inexpensive source of proteins, carbohydrates, mineral salts and vitamins B. Reduced consumption of bread is closely connected with an improvement in the peasant standard of living.

Consumption of meat. — The consumption of meat varies greatly and depends as a rule on the state of prosperity of the peasants. In Western Europe poor peasants only eat meat once a week and farm workers only on holidays, *i. e.* a few times a year, while the richest farmers often have two meat meals a day.

Consumption of milk. — Consumption of cow's milk varies considerably from one region to another. In many districts, practically no milk is consumed at all and even children never drink it. All too often the peasants look upon milk, butter and cheese as produce for sale rather than as essential foods for their family. Various surveys show that the consumption of the different protective foods by the majority of the rural population is absolutely insufficient.

Consumption of vegetables and fruit. — The consumption of vegetables and fruit is too low in every country. The use of these foods must be progressively increased if a sufficient quantity of protein, mineral salts and vitamins is to be assured.

Obviously it would be necessary to have an exact knowledge of the annual consumption per head in order to know whether the diet of the peasant classes contains a sufficiency or a deficiency of energizing foods. Unfortunately, accurate statistics on this subject are still lacking.

Consumption of alcohol. — One of the factors which exercises an influence on diet and on the economic conditions of the rural population is the consumption of alcohol. Too little attention is paid to alcoholism when contemplating an improvement in the health and productive capacity of peasants; this is doubtless due to the fact that the problem is very complex and to the tragic conflict between economic and health interests, to the production of alcohol on the one hand and to its consumption on the other.

In every country the rural population is a large consumer of alcohol and alcoholic drinks. The quantity of spirits consumed varies between 15.2 per

cent. in Denmark and 77 per cent. in Yugoslavia; for the other countries, the figures are as follows:

| | | | |
|-------------------|--------|-----------------------------|--------|
| Poland | 74.0 % | Scotland | 36.7 % |
| Latvia | 59.0 % | Finland | 34.0 % |
| Hungary | 51.8 % | Germany | 29.0 % |
| France | 48.8 % | Switzerland | 23.0 % |
| Sweden | 37.7 % | England and Wales | 18.0 % |

Consumption of alcohol.

| Country | Number of inhabitants (thousands) | Rural population % | Alcoholic consumption per capita (in litres) | | | | |
|-----------------------|-----------------------------------|--------------------|--|-------|-----------------------|------|---------------|
| | | | Pure alcohol | Wine | Cider and fruit wines | Beer | Strong drinks |
| Germany | 79.4 | 29.0 | 4.1 | 7.3 | ? | 56.4 | 3.1 |
| England | 40.8 | 18.0 | 4.9 | ? | ? | 93.1 | 1.0 |
| 1937 | | | | | | | |
| Scotland | 4.8 | 36.7 | 3.0 | ? | ? | 36.4 | 11.8 |
| Denmark | 3.7 | 15.2 | 2.4 | 0.2 | 0.1 | 1.7 | 0.4 |
| Finland | 3.8 | 34.0 | 1.4 | 0.4 | ? | 5.7 | 27.6 |
| France | 42.0 | 48.8 | 20.0 | 165.0 | 11.0 | 34.0 | 2.6 |
| 1932-33 | | | | | | | |
| Hungary | 9.0 | 51.8 | 4.3 | 41.9 | 0.5 | 2.7 | 0.8 |
| Latvia | 2.0 | 59.0 | 4.5 | 0.1 | — | 6.0 | 5.4 |
| Poland | 35.0 | 74.0 | 1.2 | 0.1 | ? | 3.6 | ? |
| Sweden | 6.3 | 37.7 | 3.5 | 0.7 | ? | 21.4 | 4.5 |
| 1930 | | | | | | | |
| Switzerland | 4.1 | 23.0 | 12.3 | 47.0 | 40.0 | 64.0 | 6.0 |
| Yugoslavia | 15.4 | 76.4 | 6.0 | 27.4 | ? | 2.6 | 6.5 |

The conviction that alcoholic beverages have great nutritive and medicinal value is more widespread in the country than in the towns.

One of the most fatal consequences of this idea is that alcohol is given to children. This happens rarely in towns but is frequent in country districts where even tiny children are given their share of alcohol when there are family gatherings, etc. It is quite common to see mothers giving their babies a piece of sugar dipped in some alcoholic beverage, especially when the child is restless and fails to go to sleep.

Special emphasis should be laid on the dangers of the absorption of alcohol in any form by the young.

The importance of the temperance campaign in country districts should not be neglected, as it combats degeneracy, leads to the improvement of the peasants' economic condition and is also often a means of counteracting malnutrition.

Food deficiencies.

Several Institutes of Hygiene consider that some symptoms of deficiency diseases indicate that the diet of the peasant class in certain European countries is unbalanced. Such cases are often due to deficient diets which are, however, adequate from the standpoint of production of energy and are not actual instances of complete malnutrition.

The rural population is far from making full use, for its own food requirements, of the indispensable amount of foodstuffs produced locally. The diet of small farmers and farm labourers, the essential part of which consists of bread, potatoes, legumes, green vegetables and fruit (of an inferior quality), milk foods (in small quantities), includes only an inadequate proportion of meat (used only to make the meal more appetizing); this quantity of meat is considerably less than is necessary when account is taken of their daily work and the requirements of modern hygiene as regards diet.

A large part of the rural population suffers from quantitative malnutrition after bad harvests in the U.S.S.R., and in some parts of Central, Southern and Eastern Europe.

In most of the agricultural countries of Europe, the energizing value of the diet is much higher during the summer and autumn than in winter and spring, when it is much reduced and sometimes deficient. The nutritive value of the diets varies considerably with the season. From the standpoint of calories the level is lowest in spring and highest in summer. The content of proteins and animal fats is only high on fête-days, at other times it is very low. During other periods the content of vegetal protein is fairly high, while that of fats is very low. The greatest difference between the diet of poor rural families (with large numbers of children) and that of well-to-do families appears to be in the quantity of fats and animal proteins consumed, as well as in the quantity of mineral salts and vitamins. The total consumption of fats and carbohydrates increases more or less in the same proportion and parallel with the increase in income of the family, while the percentage of animal proteins progresses more rapidly than the increase in income. When wages are high, much larger quantities of fats and proteins are consumed, while the quantity of carbohydrates declines.

A study should be made of the consequences of malnutrition from the standpoint of the health of rural populations. In the case of tuberculosis, for instance, it is found (see the report on rural hygiene submitted to the League of Nations by Dr. CHODZKO) that in countries such as France, Poland, Switzerland and the United States of America, the peasants are becoming more and more exposed to the ravages of this disease. KELLNER's study of mortality statistics proves that the agricultural regions of Europe suffer from more than double the amount of tuberculosis registered in industrial countries such as Germany, Belgium and the United Kingdom. French statistics (1928) show that between the ages of 20 and 39, the mortality from tuberculosis in the towns amounts, per 10,000 inhabitants, to 28.2 for men and to 23.9 for women; in country districts these figures become 34.2 and 29.9 respectively. Statistics

published in the report submitted by DR. STOUMAN to the European Conference on Rural Hygiene (Geneva, June 29, 1934), prove that the mortality due to tuberculosis in Sweden and Denmark is as high in the country as in the towns.

The most serious and advanced forms of this disease are more frequent in the country, and this is chiefly due to malnutrition and physical exhaustion (ergometric tests show that peasants are physically weaker than town workers).

It has already been stressed that there is very often a vitamin deficiency in rural diets and in all the regions of the various countries it appears that the poor peasant is constantly in danger of suffering from serious dietary deficiencies, especially at the end of winter and in the spring. In spring, when the diet is poorest, symptoms due to a deficiency of vitamins in the diet are often observed, rickets, scurvy and anaemia appearing among young peasant children especially, as well as tetanus, xerophthalmia and keratomalacia in newly born infants. Hemeralopia often occurs among peasants. Pellagra is very common in regions such as Romania, where the people live mostly on maize. In the frontier villages between Bulgaria and Romania, the Romanian population suffers from this disease, while the Bulgarians, although they use the same cereal as the basis of their diet, are not affected, because they grow and consume more vegetables.

As regards mineral salts, the greatest deficiency is observed in calcium and perhaps iron, while in the case of vitamins there is probably a general condition of polyhypovitaminosis, the greatest deficiency being in the vitamin B complex. A deficient diet may cause anaemia which is very common especially among peasant women in countries where it is the custom for a mother to nurse her child up to two and even three years of age.

The peasants' diet is also often impoverished by long religious fasts lasting for several weeks. During these periods the diet often contains no food of animal origin.

Measures for the improvement of diet.

The important International Institutes who have already taken an initiative on the subject must exercise their influence with the governments of some agricultural countries and persuade them to take measures rapidly in order to improve the diet of members of the farming classes who are underfed.

The methods adopted to assist the peasant from this point of view are many and varied and depend on conditions prevailing in each country. They should be arranged for each country to meet these special conditions.

In the first place it is indispensable that instruction and training concerning dietary hygiene should be intensified in country districts. In the village the women prepare the daily meals. It is therefore essential that they should be won over to the cause of health and taught as much as possible on the subject. Farming and country life are particularly trying for women, and they are soon worn out with hard and toilsome work. If they are to devote more time to the family meals they must be freed in part from this burden. Another point which should not be overlooked is the instruction of the father, who must learn to understand his wife's task and how to make it easier for her. Above all the

rising generation must be won over; instruction in housekeeping and rational healthy diet should first be taught in school and then followed up by all available methods of propaganda. Films, broadcasts, etc., are of primary importance in this field.

The waste of foodstuffs possessing valuable nutritive qualities is often due to ignorance; in many districts, for instance, whey is thrown out instead of being used.

Training in dietary hygiene should find a place in all school curricula, beginning with the elementary schools and continuing through the whole educational period. In every country research work in connection with diet should be made in the special Dietetic Institutions and in the University Faculties. It is in this environment that the new science of dietetic biotypology makes daily progress. The new discoveries made in the field of this extremely important and varied science, are of exceptional interest from the practical point of view.

In most countries the population takes a lively interest in all these matters.

An 'Advisory Committee on Diet' has been appointed in Germany (Reichsarbeitsgemeinschaft für Volksernährung), to deal with problems relating to suitable diets and study the value of the various foods. Courses and lectures are organized for the instruction of the people and of housewives in particular.

In Italy a recent decree (Gazzetta Ufficiale, No. 181, p. 2932, August 3, 1940), provides for compulsory supplementary instruction in dietetics in the faculties of Medicine and Surgery, Natural Science and Pharmacology attached to all the Universities. In this country there is also a special organization called the 'Comitato Nazionale per lo Studio del Lavoro Agricolo' which studies the diet of the rural inhabitants and contributes to its improvement.

Several countries assist families in want by distributing foodstuffs and giving school meals (either free of charge or at very low cost), milk to village children under school age and assistance to pregnant women and nursing mothers.

A very useful measure is the distribution of sugar to pregnant women and nursing mothers belonging to the farming classes who own no land and to the ranks of small farmers.

Wherever possible, it is important that bee-keeping should be encouraged, since many foods and beverages can be prepared from honey.

In order to offer the small farmer a satisfactory diet it is indispensable that the production and consumption of meat, milk, eggs, vegetables and fruits should be considerably increased.

The creation of rural slaughterhouses is eminently desirable, but as long as animals are killed in the village, it is essential that inspection should be efficient.

The question of wholesome and cheap milk is of the greatest importance, while at the same time the solution of this problem is very difficult. Every attempt should be made to ensure that children of all ages, nursing mothers, and pregnant women should be supplied with good, clean milk. (When it is not possible to pasteurize the milk effectively, boiling is sufficient to offer a complete guarantee).

Here it should be emphasized that the nutritive value of ewe's milk is very high. Research work carried out by W. ZORN, F. RICHTER and G. WIENER, of instance, shows that ewe's milk is much superior to cow's or even human milk as regards content of fats, proteins and mineral salts and consequently its calorific value is also greater.

The authors have studied cases where infants were first fed on mother's milk and then with ewe's milk; others, where cow's milk was replaced with ewe's milk. They have also proved the dietetic value of ewe's milk in the treatment of dyspepsia in infants. It is very simple to feed infants artificially on ewe's milk and in any case it gives better results than those obtained with cow's milk. It is also very easy to alter the feeding of infants from cow's to ewe's milk and if the child suffers from acute gastro-enteritis, the trouble disappears immediately with the change of milk. The authors consider that an effort should be made to encourage the use of ewe's milk for feeding infants.

The annual yield of ewe's milk throughout the world is 5 milliard (5,000 million) litres as compared with 17 milliard litres of goat's milk and 275 milliard litres of cow's milk. Europe produces 44 per cent. of the total output of ewe's milk, far ahead of Asia and Africa. Italy is the chief producing country with an annual yield of 620 million litres.

Consumption and production of vegetables on a small scale for family use should be greater than it is and should include more variety; the peasant should therefore be instructed in this also.

Consumption of fruits is also unsatisfactory; in this case production should be increased; in every country and every district wherever possible, each cottage should be surrounded by fruit trees of some kind.

When instruction is given in the cultivation of new foods suited to natural conditions and in methods for their preservation, an attempt should be made to stipulate consumption.

Campaigns against alcoholism, bad food habits and wrong ideas concerning the value of certain foods, a careful supervision of religious fasts, which still contribute towards the impoverishment of diet and are often injurious to health, will all make it possible to improve the diet of the poorer peasants.

In some contries (such as Germany, Denmark, the United States and Japan), considerable progress has already been made in this respect.

The encouragement of a healthy and rational diet is placed in the hands of competent, university-trained persons who have studied the subject from the standpoint of physiological science as well as from its economic and practical aspects.

These 'nutritionists' are always in direct contact with the masses, teaching them simply, advising, explaining and directing them, without forgetting the main factor of individual means. Moreover, 'demonstration agents' travel through the country districts where they make every effort to organize 'local clubs' for training volunteers who in their turn undertake to reform the diet of their neighbours, teaching then the particular food requirements of the rural population, and stimulating the production of various products in order to provide the basic foods with the required supplementary nutritive elements. Nutrition

specialists are trained in the U. S. S. R. for the special purpose of supervising collective alimentation.

Account should also be taken of the influence on the diet of the masses exercised by tariffs and quotas, transport system, organization of production and distribution.

The general improvement in purchasing power the decline in wholesale and retail prices, the application of differential prices for certain social groups, the careful issue of loans to the poorer farming classes, are all measures of a general character which tend to improve rural diet. Owing to the importance and urgency of the problem these methods should be adopted without delay.

After making these suggestion, realistic consideration should be given to the practical side of the matter and each country should work out a production plan and a policy for rational distribution and consumption, with due regard to the requirements of the different regions. This is a fundamental task, involving much complicated work.

Early signs of malnutrition, although often difficult to identify, should be sought out, as this has become a pressing problem of the moment in every civilized country.

The future improvement of diet cannot be accomplished without a combined effort on the part of all Agricultural Institutions, large and small.

The programme of the International Institute of Agriculture includes a special study of the problem of improving the diet of small farmers, who form the great majority of the army of tillers of the soil.

E. LELESZ

Publications consulted:—

- ABDERHALDEN, E., *Probleme der Ernährung in der jetzigen Zeit.* — Zeitschrift für Volkerernährung, Berlin 1940, 15. Jahrg., Heft 1.
- ADANT, et BIGWOOD, E. J., *Note déposée à la Section d'Hygiène de la Société des Nations.* Document C. H. (Comm. Exp. Alim.) 34, Genève, 1937.
- AIELLO, G., *Dati sull'alimentazione dei lavoratori agricoli e particolarmente di quelli stagionali.* — Il Problema Alimentare, Roma, 1940, s. II, a. IV, fasc. I, p. 21.
- ATWATER, R. M., *The health conservation contest. Rural tuberculosis a special problem.* — American Journal of Public Health, New York, 1936. No. 26, pp. 23-26.
- AMANTE, G., *Influenza dell'alimentazione sulla riproduzione e sui caratteri della prole.* Atti del VII Convegno Volta. R. Accad. d'Italia. Roma, 1938.
- BAGLIONI, S., *Valore fisiologico e igienico dei prodotti e delle carni dei volatili e animali da cortile nell'alimentazione umana.* — Il Problema Alimentare, Roma, 1939.
- BAGLIONI, S., *Fabbricazione di prodotti alimentari ricchi di vitamine.* — Comptes rendus du VI^e Congrès international technique et chimique des Industries agricoles. Budapest, 1939.

- BARBIERI, B., *Indagine statistica sulle disponibilità alimentari della popolazione italiana dal 1922 al 1937*. — Roma, 1939.
- BIGWOOD, E. J., *Importance de l'alimentation rationnelle en hygiène sociale*. (Rapport présenté au II^e Congrès des Oeuvres nationales de l'Enfance). Revue Belge de Puériculture, n° 3, Bruxelles, 1937.
- BIGWOOD, E. J., *Directives pour les enquêtes sur la nutrition des populations*. — Commission technique de l'Alimentation. Organisation d'Hygiène. Société des Nations. Genève, 1939.
- BIGWOOD, E. J., et ROOST, G., *L'alimentation rationnelle et les besoins énergétiques d'une population ouvrière*. — Publications de l'Institut de Sociologie Solvay, Université libre de Bruxelles, 1934.
- BOTTAZZI, F., *Documenti per lo studio della alimentazione*. Napoli, 1933.
- BURNET, E., et AVKROYD, W. R., *L'alimentation et l'hygiène publique*. — Bulletin trim. Org. hyg. de la Société des Nations, n° 4, p. 327. Genève, 1935.
- CHEVALLIER, A., *Rapport sur la vitamine A au 25^e Congrès français de Médecine*. Marseille. — Edit. Masson & Cie. Paris, 1938.
- CERQUIGLINI, S., *Sul valore alimentare di pane confezionato con miscele di farine di cereali e di legumi*. — Il Problema Alimentare, Roma, 1940, s. II, a. IV, fasc. I, p. 1.
- DEBUCHY, J., *Contribution à l'étude de la lutte antituberculeuse dans les milieux ruraux*. — Thèse. 135 pages. Nancy, 1933.
- DUMONT, R., *L'amélioration de l'alimentation condition du progrès agricole*. — Problèmes Agraires et Politiques de Paix. Edit. Tustier. Paris, 1939.
- JCHOK, G., *Tuberculosis in rural areas*. — Bull. of the Health Organisation, Vol. VIII, Nos. 4-5, p. 552. Geneva, 1939.
- JUHASZ-SCHAEFFER, *Schwangerschaftsmermalopie und A. Vitamin*. — Klinische Wochenschrift, München 1939, Nr. 17, S. 407.
- LAUGIER, H., et LIBERSON, W., *Programme général de recherches sur les mesures et épreuves biologiques permettant de définir les états de sous-nutrition*. — Bulletin trimestriel de l'Organisation d'Hygiène, Genève, 1936, vol. V, n° 3, p. 562.
- LORZ, F., und SCHAPER, H., *Kriegsernährungswirtschaft und Nahrungsmittelversorgung vom Weltkrieg bis Heute*. — Hannover, 1938.
- MANGOLD, E., *Wandlungen der Ernährungsstruktur und physiologische Begründung der Kostmasse. Vorrats-Pflege und Lebensmittel Forschung*, Berlin 1938. Bd. I, Nr. 2, S. 65.
- MARQUIS, C. J., *Subsistence farming. A study of measures designed to improve the status of the farm population in the low-income groups*. — Report submitted at the XVth General Assembly of the International Institute of Agriculture, Rome, 1940, 6 pp.
- MCDUGALL, *Nutrition and agriculture*. Report submitted at the XIIIth General Assembly of the International Institute of Agriculture, Rome, 1936, 8 pp.
- MEYER, K., *Grundsätze und Ziele Nationalsozialistischer Agrarpolitik in Gefüge und Ordnung der deutschen Landwirtschaft*. — Reichnährst-Verlag-Ges. Berlin 1939.

- MEYER, K. *Die Bedeutung der Landwirtschaftswissenschaft für die heutige Nahrungsversorgung*. — *Forschungen und Fortschritte*, Berlin 1940, 16. Jahrg., Nr. 16/17 and Nr. 18.
- MOURIQUAND, G. *Les facteurs de révélation dans les dystrophies inapparentes*. — *Presse médicale*, Paris, 1934, vol. 42, p. 369.
- MOURIQUAND, G. *Avitaminoses asymptomatiques*. *Acta Vitaminologiae*, Wilno, 1938 vol. I, fasc. 4.
- ORRÙ, A., *Il valore alimentare di alcuni derivati del latte*. — *Quaderni della Nutrizione*, Roma, 1938, vol. V, n. 3-4.
- OTTOLENGHI, D., *Ambiente rurale e tubercolosi in Italia*. — IV Congresso nazionale per la lotta contro la tubercolosi. Monografia di 169 pp. Bologna, 1932.
- PETRAGNANI, G., *La tuberculose rurale en Italie*. — *Bulletin de l'Office International d'Hygiène Publique*, Genève, 1938, n° 30, p. 791.
- PAETZMANN-DULON, E. *Untersuchungen über die Ernährung bäuerlicher Familien*. Verlag A. Barth, Leipzig-Berlin, 1940, I. Teil; 1937, II. Teil.
- RANDOIN, L., *Les données et les inconnues du problème alimentaire*. Les presses universitaires de France, Paris, 1929.
- RANDOIN, L., *Vues actuelles sur le problème de l'Alimentation*. — Edit. Hermann, Paris, 1937.
- SHERMAN, H. C., *Chemistry of food and nutrition*. — The MacMillan Company, 640 pp. New York, 1937.
- SCHEUNERT, A., *Strukturwandlung der deutschen Volksernährung und Vitaminversorgung*. — *Vorrats-Pflege und Lebensmittel Forschung*, Berlin 1938. Bd. I, Heft 3, p. 129.
- SCHEUNERT, A., *Die Erzeugung vitaminreicher Lebensmittel unter besonderer Berücksichtigung der Obst- und Gemüsekonserven*. — *Comptes rendus du VI^e Congrès international technique et chimique des Industries agricoles*, Budapest, 1939. p. 1-14.
- SZULC, G., *L'alcoolisme dans les milieux ruraux*. — *Bulletin de l'organisation d'Hygiène de la S. d. N.*, Genève, 1940, vol. IX, n° 1.
- SWARZ ROSE, M., *A laboratory handbook for dietetics*. — Edit. MacMillan Co. New York, 1937.
- TERROINE, E., *La part protéique dans l'alimentation humaine*. — *Bulletin de l'Organisation d'Hygiène, S. d. N.*, Genève, 1936, vol. V, n° 3, p. 472.
- WOLF, L. K., BANNING, et VAN EEKELLEN. *Alimentation de plusieurs groupes de familles aux Pays-Bas*. — *Bulletin trimestriel de l'Organisation d'Hygiène de la S. d. N.*, Genève, 1936, n° 5, p. 617.
- VAN DER VAEREN, Y., *L'organisation de l'enseignement technique pour agriculteurs*. — *Conférence européenne de la Vie rurale*. Genève, 1939.
- VISCO, S., *Alimentation dans les Colonies Italiennes*. — *Extrait du rapport du II^e Congrès international de la Société scientifique d'Hygiène alimentaire*, Alençon, 1938.
- Some information was also taken from the Bulletin of Health [Organization of the League of Nations, 1935 (No. CH. 1197), 1936 (Vol. III), 1937 (Vol. VI), 1938, (Vol. VII), 1939 (Vol. VIII)], and the 'Travaux de l'Institut de Physiologie et d'Alimentation', Wilno University (Sol. VIII-IX, 1934-37, *Acta Vitaminologiae* (Vol. I-V), Wilno, 1938-39).

MISCELLANEOUS INFORMATION

A Possible Application of Vitamin B₁ in Horticulture.

The action of the growth hormones and their possible applications are quite well known now and are being exploited commercially. Considerable success has attended the use of the root growth hormone and related organic substances that may be produced more cheaply, and their use is becoming increasingly widespread in the propagation of plants by cuttings; even such notoriously intractable plants as rhododendrons being amenable to the new technique.

An article was published on this subject in this *Bulletin* No 11, November, 1938 and although vitamin B₁ is included in a list of plant stimulants given there, it is only mentioned as a substance with a beneficial effect on the growth of beans and aleurites. In the last year or so further work has been published and it would now seem that a technique may be available to overcome the troublesome phenomenon of root shock which prevents the successful transplantation of many flowers, bushes, and trees except at certain seasons of the year. The suggested treatment is to wet the roots or to water the plants after transplanting with a very dilute solution of vitamin B₁, solutions as dilute as 1 : 100,000,000 having the desired effect.

This substance is best known as the antineuritic factor in animal and human nutrition and as one of the essential growth factors for yeasts and moulds; whilst the above application and other little known botanical effects of the vitamin have been investigated recently at the California Institute of Technology.

Some remarkable reports have been published concerning the peculiarly vigorous growth of plants after watering with extremely dilute solutions of the vitamin. Flowers of abnormal size have been obtained in this way, 'daffodils with blossoms as big as salad plates and tea roses with 5 inch buds' being mentioned.

J. C. H.

Present importance of sunflower cultivation in the Argentine Republic and its influence on the production of vegetable edible oils.

Up to 1920, the sunflower was cultivated in Argentina merely as an ordinary garden plant, and was of no practical importance in the agriculture and economy of the country. Only then did the public authorities and the Argentine farmers begin to take a serious interest in this plant, in view of its utilization as an oil-yielding and as a forage crop. There has been a strong tendency in the last five years towards an increased utilization of sunflower seed for oil production, and it may be said that this plant is now the basis of the Argentine vegetable edible oil industry, an industry which is continually expanding. According to the reports of the Argentine Ministry of Agriculture, in 1938 the total production of vegetable edible oils amounted to 725,170 quintals, 350,220 quintals sunflower seed oil, 145,720 quintals cottonseed oil, 88,570 quintals rape-oil, 59,600 quintals groundnut oil, the remainder being linseed, olive, maize, grape-stone oils, etc. In 1935, production totalled 514,245 quintals, being

59,640 quintals sunflower seed oil, 194,320 quintals groundnut oil, 142,650 cottonseed oil and 117,635 quintals rape-oil. These figures show that the present development of the oil industry in Argentina is based chiefly on sunflower seed, to the detriment of groundnut and rape. In 1938, the area under sunflower amounted to 318,848 hectares as against 3,800 hectares in 1924. In 1940, it is expected to increase this area to 469,600 hectares, with a production of over 500,000 quintals. The increased production of vegetable oils in Argentina has already led to the gradual elimination of olive oil on the Argentine market. In the last five years, olive oil imports have fallen by 120 per cent. compared with the average for the period 1928/1932.

The use of sunflower seed in the Argentine oil industry dates from 1924. In that year, 282 tons of seed were milled, producing 52 tons of oil, a yield of 19 per cent. The improvements made in this industry increased this yield to 25 per cent. in 1938. The oil-cake, for cattle feed, is exported to Germany, Denmark and the Scandinavian countries. The Argentine Government encourages the home production of oil-yielding seeds, with a view to entirely eliminating the importation of foreign produced vegetable oils and fats. The Argentine market, moreover, offers good prospects for a still further development of the home industry.

The market has already benefited by the heavy demand for oil for industrial purposes. The sunflower may be cultivated as the chief crop or as an intercalary crop, and also be cultivated on saltpetrous land or soils too dry for other crops. The seeds originally used, which were imported by the Russian settlers, have been replaced by an early pure variety of uniform height and good industrial value (25-27 per cent. oil is obtained from the seed).

A. P.

BOOK NOTICES *

FALKNER, F. R. *Beiträge zur Agrargeographie des afrikanischen Trockengebietes*. Geographische Abhandlungen. Dritte Reihe, Heft II. Stuttgart, J. Engelhorn's Nachf. Adolf Spemann, 76 pp., 2 maps.

[The A.'s aim is to study the natural limits of non-irrigated agriculture in the arid regions of Africa. He also attempts to establish relations between these limits and weather conditions as well as other factors.

He considers that the cultivation of the land is dependent on the following factors: climate (limit determined by lack of water, limit dependent on temperature); soil (nutritive matter, physical composition); vegetation and fauna (living conditions of cultivated plants, micro-organisms, parasites and noxious insects); possibilities of human life (presence of drinking water and materials for the construction of shelter); degree of culture attained by man (knowledge of agriculture, preference for a sedentary rather than a nomadic life, etc.).

The A. deals with all these limitations, especially in the case of water. He studies rainfall, loss of water due to run-off and evaporation and examines the formulae which have been established in order to determine the limitations placed on agriculture by drought.

The third chapter is devoted to soil and vegetation, the fourth to the system of dry farming.

* Reviews of books presented to the library appear under this heading.

The study is based mainly on statistics found in other publications, as the A. has only visited a very small part of Africa. The inclusion of some very instructive maps makes this work a useful contribution to the study of the important problem of land expansion vital to mankind. It is to be regretted, however, that the records available to the A. were far from being complete. He has omitted to study certain works which would certainly have altered many of his conclusions. In this connection mention may be made, for instance, of W. R. THOMPSON's basic work 'Moisture and Farming in South Africa', published in 1936].

W. B.

NEUBAUER, Hugo. *Die Keimpflanzenmethode, ein physiologisch-chemisches Verfahren zur Bestimmung der den Pflanzen zugänglichen Bodennährstoffe Kalium und Phosphor*. Berlin, Verlagsgesellschaft für Ackerbau, 1939, 168 pp., 9 fig., price: 3.45 RM.

As is known the Neubauer method of soil analysis also called 'seedling method' consists in the pot cultivation, on a very reduced scale, of rye (100 seed) for a very brief period, using a very small quantity of the soil which is to be examined for its content or deficiency in plant nutrients. The method in question is the subject of this book.

The first pages cover some general questions such as conditions of soil analysis and the difficulties involved, relation between laboratory and field experiments, etc. The A. then explains the principles of the method, devised and advocated by himself, and now known as the NEUBAUER method.

The main part of the book is devoted to the description of this method: including (1) taking and preliminary treatment of soil samples; (2) cultivation of the rye plants; (3) analysis properly so called, *viz.*, determination of the phosphoric acid and potash content. This analysis is particularly important, as the possibility of an exact and rapid determination of the plant nutrients decides the practical value of any method of this type. It is to the system of photoelectric determination, based on the studies of SCHUHKNECHT and elaborated by Dr F. WAIBEL, however, that the NEUBAUER method owes its practical success in recent years.

The A. describes in detail the photoelectric method of determining the P_2O_5 and K_2O by means of the special apparatus constructed by the Zeiss Company.

In conclusion, the A. discusses at length the application of the results of analyses in estimating the value of fields, and the practical conclusions which may be drawn by the farmer.

N. G.

ELLIS, J. C. G. *The feeding of farm livestock* (Agricultural and horticultural handbooks). London, 1937, 291 pp., tables and photographs in the text. Price 15s.

[This work is to be recommended for its practical utility and the clear way in which every aspect of the subject is discussed. The fact that it is complete will make it suitable for use on both large and small farms.

The chapters are arranged most logically. The first forms the introduction in which the A. expounds the properties of the six main chemical substances contained in the diet of animals, *i. e.*, water, minerals, proteins, fats, carbohydrates and vitamins. This is a well chosen opening which serves as an explanation of how the animal's need for one substance or another corresponds to some definite function. Research towards establishing 'standard' diets, based on KELLNER's well-known methods and on recent investigation leads naturally to the composition of diets to meet the needs of the principal aspects of animal production (milk, meat, draught).

In the following chapters the A. reviews the various foods. After grouping them into categories according to type, he describes their particular nutritive value, always giving first importance to the proportion existing between the quantity of protein and the starch value of each one. By means of the variations in this proportion it is possible to make comparisons between various foods, whether considered individually or in groups.

The dozen or so pages devoted to the subject of ensilage are worthy of notice. They show the progress attained in the preservation of forage and stock-feeds, as the A. describes the latest methods and types of silos adopted recently.

Then follows a detailed study of diet based on the principles and observations mentioned above and suited to each particular category of livestock. This is obviously the most important part of the book from the practical standpoint; it will certainly be very useful to stockbreeders and its accurate information will be of considerable help to them. Methods of feeding animals which make use of modern material are emphasized and illustrated by numerous photographs.

Lastly, the book is completed by an explanatory table showing the composition and nutritive value of the principal stock-feeds].

S. G. C.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

PRINTING OFFICE 'CARLO COLOMBO' — ROME, OCTOBER 15, 1940.

MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

NEW ASPECTS, THEORETICAL AND PRACTICAL, OF FORAGE ENSILAGE

The author reviews the different methods of ensilage: high temperature or sweet ensilage, the 'Cremasque' system, acid ensilage by means of mineral acids and low temperature or acid fermentation ensilage. He also describes and discusses the experiments carried out at the Experiment Station of Agricultural Bacteriology at Crema, Italy, on ensilage by acid fermentation, fermentation agents, causes promoting fermentation, and in conclusion indicates the rules to be followed to obtain successful results.

Acid fermentation system

The value of the ensilage system in conserving forage is well known. This method makes it possible to accumulate feed reserves which are essential in the period when, owing to drought, excessive rain or cold there is a scarcity of fresh forage on the farm.

If ensilage, therefore, is highly important in all regions of intensive agriculture, it is still more so in countries with heavy rainfall or a very dry climate. The regions at the foot of the Alps come within the first category, while central, southern and insular Italy, where stock-feeding is based chiefly on spring and autumn herbage (the dry summer checks forage production to a considerable extent) is typical of the second category.

In all countries of intensive agriculture, forage ensilage is a problem of long standing, and from all parts of the world different systems have been suggested. There are four basic systems: high temperature or sweet silage; low temperature or acid silage; hay silage, Cremasque process also known as the Italian process; acid silage, using mineral acids. All these systems excepting the Cremasque (cremasco) are used for fresh herbage, *i. e.*, herbage which has not be subjected to any preliminary drying, and which contains its normal amount of moisture and even in some cases, additional moisture due to rain, dew or the residue of irrigation water. Occasionally, however, owing to special environmental conditions, before ensilage the herbage has lost moisture to a variable extent.

Sweet silage. — This silage is characterized by a low acid content and is obtained by ensiling the fresh herbage in successive stages. In this way the air which is introduced into the ensiled mass accelerates the respiration process and to some extent, the oxidation phenomena which, developing very rapidly,

easily raise the temperature of the ensiled forage to 65° C. and over. When this temperature is reached, the silage is compressed by a pressure of 3.5 qls. per m². This pressure checks the respiration phenomena and causes the temperature to drop. The product obtained presents organoleptic characteristics similar to those of 'brown hay'. The function of the micro-organisms in this type of silage is practically nil; the high temperature attained eliminates a large part of the micro-organisms present, leaving only the spore-forming forms together perhaps, with butyric ferments. The pronounced intra-cellular combustion which takes place in the forage causes heavy losses in dry matter, losses which may vary considerably, but which, generally, are never estimated at less than 30 per cent. On the other hand, if the temperature does not attain and remain for some time at 65-70°C., the ensiled mass will easily decompose, decomposition being accelerated by the high moisture content and favourable conditions of temperature. This system, therefore, is rather uncertain as it is difficult to regulate the temperature of the mass with sufficient uniformity. Thus, foci of decomposed matter may easily form and nuclei of butyric fermentation develop; this is a serious disadvantage making the feed unfit for consumption as it contaminates the milk. This danger of contamination together with the heavy losses in forage involved even when results are fairly satisfactory has caused this system to fall into disuse although formerly it was widely used.

Cremaesque silage. — This well known method is an improvement on the acid silage system made by SAMARANI of the Experiment Station of Agricultural Bacteriology at Crema, Italy. The preserving principle, however, is largely based on the action of CO₂ formed through the respiration process of the ensiled plants which are put into the silos when half wilted, that is, when their moisture content is below 50 per cent. The system of closing the silo made in such a way as to retain as much CO₂ as possible and the low moisture content prevent heating of the mass, and consequently the micro-organisms being rendered practically inactive and the enzymatic phenomena very limited, losses in the nutrient principles are very small.

Naturally the use of this system is restricted by climatic conditions as a favourable climate is necessary for this semi-wilting, which in turn is essential if good results are to be obtained.

This system cannot be successfully used in areas with a heavy rainfall and cannot be carried out late in the season, that is to say at the time when large quantities of green fodder are available. In these instances, very frequent, as stated earlier on in this article, in the regions at the foot of mountains and in general in cold countries, the systems suitable for fresh and wet herbage, the Finnish system also known as the A. I. V. method and the acid fermentation method are particularly indicated.

Finnish system

This system is based as is known on the acidification of the green forage with hydrochloric or sulphuric acid to bring the pH to 3.4-3.8 which is sufficient to check all proteolytic activity, both microbial and enzymatic. Its use, however,

is limited to large farms with a trained personnel to carry out the different operations correctly. It is best suited for use in regions with a heavy rainfall or prolonged irrigation as for example, in the Lombard 'marcite'.

Acid fermentation system

This system is also known as acid or cold silage. The conservation of the forage is due essentially to the acidity developing from fermentation and to the transformation into organic acids of the sugars contained in the forage. To be successful, it is indispensable that this acidification should be sufficiently penetrating and rapid to prevent from the beginning any harmful processes produced through the deterioration of the nitrogenous substances.

This system, which evidently appears to be the most simple and consequently the most easily applied in both large and small farms, has, since 1936, been the object of further study at the Crema Station of Agricultural Bacteriology. It has been possible to ascertain the conditions under which the acidification process takes place and specify the biological agents of the process.

Investigators are agreed that for the acidity of the forage to check proteolytic phenomena, the pH should be about 3.4 to 3.8, if mineral acids are added; but, if the acidity is of biological origin, that is, a product of fermentation, even if the pH is lower (e.g. 4-4.4, it is sufficient to prevent the development of enzymatic activity on the nitrogenous substances as well as the growth and propagation of the micro-organisms which check caseation. With the A. I. V. system, this development and spread of micro-organisms is never entirely eliminated, as seen from the fact that Virtanen himself does not advocate the use of his system of ensilage for dairy herds.

It is possible that in ensilage by fermentation, certain other biological factors assist the action of the acids, factors which act chiefly on the micro-organisms which check caseation, and which could be included among those which are the basis of the well known phenomena known as microbial antagonism.

Origin of the acids

Most investigators agree that the majority of the acids found in the green forage are of bacterial origin. Opinion differs as will be seen later, on the systematic nature of the acidifying micro-organisms. Some workers, including BABCOCK and RUSSELL (1) formerly attached great importance to the enzymatic phenomena which, it was thought, brought about the formation of the acids. Without going into detail on these early experiments, it is enough to indicate that they show a want of microbiological observation and, in general, appear to be devoid of both the biological and chemical control so necessary in these studies. The little and incomplete knowledge then available on the acidifying micro-organisms of forages no doubt led to attributing to hypothetical enzymes of the plant cells, this activity which is, on the contrary, a physiological prerogative of certain micro-organisms.

The question has been taken up again by some investigators within the last ten years, but the conclusions attained do not agree. S. H. HANSEN (2) and

U. PRATOLONGO (3) inclined towards enzymatic origin, while B. CURIN (4) favoured microbial origin. Studies have also been carried out on this question at the Bacteriological Station of Crema and in a preliminary report written in collaboration with POLITI (5), I showed that by suppressing or limiting, through treating the forage with mild antiseptics, the activity of the acidifying microflora, the sugars contained in the forage only undergo slight deterioration, while at the same time, the acidification of the forage only increases to a very small extent.

In other still further conclusive experiments using sterile plants, no acidification was found even after several days of storage. Similar experiments were made with unsterile material and on this innumerable acidifying micro-organisms were found; the pH attaining 3.75. Other experiments by my co-worker I. POLITI (6) carried out along the same lines gave similar results. By growing maize plants sterilely and keeping them in an atmosphere of nitrogen, and adding to some of these plants pure cultures of acidifying micro-organisms, the following results were obtained.

| | pH | Sugar |
|---|-----|-------|
| Initial value | 5.6 | 4.0 ‰ |
| Sterile maize | 5.7 | 5.5 ‰ |
| Maize with the addition of acidifying micro-organisms | 4.3 | nil |

The results of this experiment in which the highest content of sugar observed in the sterile plants is to be attributed to a concentration of the juices, clearly show that in the absence of acidifying micro-organisms, the plants cannot transform the sugars themselves into organic acids. The acidifying enzymes of the plant cells for the moment, therefore, are only a hypothesis, while our knowledge on the existence, diffusion and biochemical properties of the acidifying micro-organisms is much more concrete.

This conclusion is not without practical consequences, as only by knowing the mechanism of acidification, is it possible to draw up definite rational rules governing the phenomena of fermentation which develop in ensiled fodder.

Type of acidifying micro-organisms

Until recently, most investigators studying this question only spoke generically of 'acidifying micro-organisms' or classified them as 'lactic ferments'. Some including GORINI (7) and KAISER (8) have described as lactic streptococci, bacterial forms related to *B. bulgaricum*, acid-proteolytic bacillary form. More recently, however, ALLEN, HARRISON, WATSON and FERGUSON (9) have thrown some doubt on the influence of lactic streptococci on the process of acidification and they suggest that this function could be attributed to *Strept. plantarum*. VAN BEYNUM and PETTE (10) have arrived at the same conclusion, pointing out that ordinary lactic ferments can seldom cause acidification of ensiled herbage. VIRTANEN also (11), reports the presence of micro-organisms resembling *Streptobacterium plantarum* in herbage ensiled with mineral acids; a similar observation was made by CUNNINGHAM and SMITH (12).

During this period when little coordinated work was being done on the question, systematic experiments were being carried out at the Crema Station. From different samples of ensiled herbage, using the acid fermentation and A. I. V. systems, numerous strains of acidifying micro-organisms were isolated; on these were carried out systematic research and also a comparative study of the morphological and biochemical characters (13). Three or four basic forms of asporogenous bacteria, long 1-2.5 micron, Gram-positive, not liquifying gelatine, forming punctiform colonies on agar-malt infusion and on agar broth were differentiated. They are characterized by having a weak or no action on lactose, while they ferment glucose, saccharose, laevulose, maltose and, what is more significant, arabinose and xylose. They do not coagulate milk or if they do so, only after 20 days incubation. They are facultative anaerobes and their optimum temperature lies between 30 and 37°C. They grow vigorously in plant juices, both of grasses and legumes. In some I have been able to show the fission capacity of the xylane and the subsequent utilization of the products of hydrolysis (14). They appear to form, therefore, a xylanase which besides acting on this important constituent of common forage plants during storage in the silo, may also exert a favourable effect on the digestive phenomena of herbivora, as SELLIERE supposed as early as 1909, though not suspecting microbial origin.

The acidifying capacity of these micro-organisms is very high; they lower the hydrogen ion concentration of nutrient liquids to a pH of 3.4-3.2 while the optimum pH is about 5.5.

The acidity produced is due mainly to lactic acid and in a lesser degree to acetic acid; the quantity of the latter, however, varies according to the different strains isolated, and in some cases is only slightly less than the lactic acid.

In the meantime, while studies are working out to a more definite conclusion, these characteristics may justify what has been said on the micro-organisms in general or at least certain common forms, with the species *Lactobacillus pentoceticus* (Fred, Peterson & Davenport) and *Streptobacterium plantarum* (Orla-Jensen). It should be noted that besides these, there are also acidifying cocci, more or less inactive on both lactose and milk.

The systematic microbiological tests of different samples of ensiled herbage and the experiments on storing forage in micro-silos have always proved the presence of the micro-organisms in question. Not only do these organisms multiply rapidly and vigorously, but, if conditions are favourable may attain remarkably high figures and have a decided predominance over the other microbial species present. Studying these microbial forms on forage plants in the field, I found them on both grasses and legumes, the number of bacteria varying from 1,200 to 23,000 per gram of green plant. Grasses do not appear to show more bacteria than legumes. This rather small quantity of specific micro-organisms may increase rapidly under the conditions present when forage plants are newly harvested; particularly in regard to the chemical composition of the herbage, degree of moisture and temperature. In other words, if these factors are favourable, the acidifying bacteria develop rapidly and proliferation continues during the first days after ensilage and, naturally, if conditions remain favourable. The content of acidifying microbes in the ensiled herbage

examined on the second day of ensilage already amounted to between 50 and 100 million microbes per gram of forage and, on the tenth day, had increased to 600-700 million and sometimes to 1000 million (always per gram of forage). The number gradually fell during the next 20 days and then more rapidly. The microbial content of herbage stored for about two months amounted to about 100 million; over longer periods, the decrease is still greater.

Parallel with the rapid multiplication of the micro-organisms, at the beginning a rapid increase in acidity takes place, which slows down in the following days, after which acidity is maintained at a fairly constant level. It is evident, therefore, that the acidifying micro-organisms should not be estimated at the beginning of ensilage, but rather during the first days of fermentation. On the other hand, the eventual presence of other micro-organisms in the ensiled herbage which adversely affect caseation and, in particular, those of butyric ferments, should be determined at the end of ensilage, when it is useful to ascertain the general result caused by the action of acidifying micro-organisms.

In different experiments carried out at Crema, it was found that the pH of the herbage after a few days ensilage fell to 4; this acidity remained at more or less the same level throughout the period of storage. As already stated, this degree of acidity is sufficient to check the phenomena of enzymatic and microbial breakdown of nitrogenous substances and also prevent the formation of flora which affect caseation.

Conditions favouring rapid acidification

In order that the acidifying microflora may develop with sufficient rapidity to bring the acidity of the herbage during the first days of ensilage to a pH of about 4, it is essential, as already pointed out that the condition of the herbage be particularly favourable for the micro-organisms themselves. The most important factors are temperature, chemical composition of the herbage, degree of aeration and moisture.

As previously mentioned, the optimum temperature for the growth of acidifying micro-organisms varies between 30 and 37°C.; this is not to say, however, that this temperature is the most favourable to obtain good silage. Other phenomena of fermentation which may occur in the herbage are also more active at this temperature, and the same is true of the oxidizing processes which always involve a reduction in organic matter. Therefore, the best temperature for ordinary silage lies between 20 and 25°C. At this temperature, the micro-organisms still develop with sufficient rapidity and intensity. It is evident that if the forage is ensiled at a still lower temperature, it will not be a disadvantage, but, on the contrary, an advantage.

Regarding the chemical composition of forage plants, those which have the highest sugar content and are relatively poor in nitrogenous matter are the most suitable for ensilage. For example, fodder maize, buckwheat, sugar sorghum, etc. are easily ensiled as their high sugar content stimulates the development of acidifying micro-organisms. Organic acids are rapidly formed and these limit the proteolytic processes which are already somewhat reduced owing to the low protein content.

The conservation of legumes, however, is more difficult, owing to their high content in nitrogenous substances and low sugar content.

As the breakdown of the proteins is due mainly to enzyme action – the lower the acidity of the forage the more intense the action – the conservation of the forage depends chiefly on the rapidity with which acidification is produced and on its intensity. Proteolysis, forming basic compounds, neutralizes part of the acid, therefore, if the acidity does not rapidly attain a degree sufficient to check proteolysis, the neutralization produced may cause the *pH* to rise beyond the limits favourable to acidifying micro-organisms, that is, a *pH* under 5.5. Conditions then become definitely unsuitable for acidification. The necessity of establishing conditions especially favourable to rapid acidification is obvious, particularly when legumes are ensiled.

The right conditions may be obtained either by the addition of small quantities of sweet substances or by mechanical treatment of the herbage, crushing or breaking, which will liberate the plant juices; these, as we have seen, constitute an eminently suitable element for acidifying micro-organisms. Bacterial growth, in fact, takes place chiefly on the surface of leaves and stalks, utilizing the juice liberated through accumulation and compression. It is evident, therefore, that any physico-mechanical treatment causing flow of the plant sap, produces rapid development of the acidifying microflora.

Different experiments on the question have been carried out at the Crema Station and the results obtained have shown that mechanical crushing or chopping of the fresh forage is very efficacious in stimulating rapid and intense acidification of the herbage.

The following figures confirm this assertion; they refer to the experiments on white clover in micro-silos after 30 days storage at 20-25°C. and at 37°C.

| | <i>pH</i> | ammoniacal nitrogen | |
|--|-----------|-----------------------------|--------------------------|
| | | $\frac{0}{0}$ dry matter | $\frac{0}{0}$ total N |
| Clover, untouched, at 37° C | 5.5 | 1.5 | 34 |
| Clover, untouched, at 20-25° C | 5.23 | 0.53 | 17 |
| Clover, crushed, at 37° C | 4.65 | 0.34 | 10.6 |
| Clover, crushed, at 20-25° C | 4.50 | 0.336 | 10.50 |
| Clover, chopped, at 20-25° C | 4.12 | 0.165 | 5 |

With this system of mechanical disintegration, the silos can be filled much more uniformly, with complete elimination of air and limitation of the phenomena of oxidation which not only cause a loss in organic matter, but also raise the temperature of the ensiled mass, a development which should be avoided.

In the system of ensilage by acid fermentation, more so than other methods, air must be eliminated from the herbage if good results are to be obtained. This is obtained if the ensiled mass is well pressed down. If the herbage is chopped before ensilage, it will have less resiliency and consequently, will allow maximum

elimination of the air present in the mass. This practice also has the advantage of regulating fermentation and making it more homogeneous through the ensiled mass. Uniformity of fermentation is of primary importance, particularly if the herbage is wet; if fermentation is variable, the movement of the liquids produced from the top to the bottom may alter the pH of the lower layers, especially if the top layers are not sufficiently protected against oxidization, resulting in an increase in temperature with subsequent proteolysis.

With regard to moisture content, that is, the degree of wilting, it should be noted that chopping causes a more or less high flow of plant juices, in proportion naturally, to the type of forage. The coarser the fodder the slower the flow, while the smaller or chopped fodders will show a more rapid elimination of the excess liquids. This elimination is in proportion to the degree of pressure exerted on the herbage. In the construction of silos, it is important, to prevent accumulation of liquids, to provide a sump or at least an opening at the lower part of the silo for rapid drainage.

The same result may be obtained, though not so effectively, by placing a layer of fagots and straw on the bottom of the silo which is not provided with any outlet, or by mixing the chopped herbage with straw which has also been chopped. Naturally, if the forage is not wet, or better still, if it is slightly wilted, there will be less difficulty. At the same time, loss in nutrients will be reduced to a minimum, as the principal nutrient elements collect in the liquid which accumulates.

From the results of laboratory experiments which have been briefly indicated and from the practical experiments carried out, it has been possible to draw conclusions of a theoretical character which help to explain the complex phenomena which take place during the conservation of fresh fodder, and to deduce some practical rules to govern these phenomena and, consequently, employ this system of ensilage by acid fermentation with confidence.

| Forage | Treatment | Moisture % | pH | Total N % dry matter | Ammoniacal N | | Butyric acid |
|--|-------------------------------|---------------|------|-------------------------------|-----------------|--------------|-----------------|
| | | | | | % dry matter | % total N | |
| White clover, slightly wilted | chopped | 66 | 4.4 | 2.85 | 0.27 | 9.3 | nil |
| White clover, slightly wilted | chopped + 1 % molasses.... | 72.2 | 4.35 | 3.1 | 0.22 | 7.1 | » |
| Fresh clover, wet | chopped | 82 | 4.2 | 2.6 | 0.25 | 9.6 | » |
| Fresh clover, wet | chopped + 1 % molasses.... | 81.4 | 4.1 | 2.7 | 0.24 | 8.8 | » |
| <i>Vigna sinensis</i> , fresh | chopped | 78.8 | 4 | 1.81 | 0.171 | 9.5 | » |
| <i>Vigna sinensis</i> , fresh and wet | chopped | 81.5 | 4.15 | 1.75 | 0.170 | 9.7 | » |
| <i>Vigna sinensis</i> , fresh and wet | chopped + 1 % molasses.... | 82 | 4 | 1.75 | 0.177 | 9.5 | » |

Before discussing these conclusions, it may be of interest to note some of the results of analyses carried out on fodder legumes ensiled, using the acid fermentation method, in June, 1939 and examined when the silos were opened in March, 1940. (See table on p. 378).

General conclusions

(1) On common forage plants (legumes and grasses) in the field, from 2,000 to 20,000 acidifying microbes per gram of fresh matter have been observed.

(2) These micro-organisms have a strong fermentative power on plant sugars, particularly the pentoses. They can also attack the pentosans but only have a very slight or entirely negative action on lactose. They differ, however, from the 'lactic ferments' of milk and milk products which were formerly considered acidifying agents of ensiled forage.

(3) These typical acidifying micro-organisms, provisionally called 'vegetal lactic ferments', can for the moment be ascribed to the species *Streptobacterium plantarum* and *Lact. pentoaceticus*. They multiply rapidly on newly harvested herbage and, within a few days, in low temperature silage increase to 500-1000 million per gram of herbage.

(4) Plant juices constitute an eminently suitable element for these microbes, which as chief product of fermentation yield lactic acid and, among the secondary products, acetic acid.

(5) After a few days in the silo, the forage, particularly in the case of grasses shows the development of microflora in which acidifying organisms predominate. The anti-caseation flora, on the contrary, is very rare and in practice is not dangerous. The 'butyric ferments', do not multiply and eventually are only found present in the limited quantity usually present in good hay.

(6) Mechanical treatment (chopping and defibrage) which facilitates the flow of plant juices, also stimulates the proliferation of the acidifying micro-organisms. The same effect can be obtained by adding sugars to chopped, ensiled legumes.

(7) If the activity of the acidifying microflora is suppressed or limited, by treating the herbage with mild antiseptics, or better still by utilizing sterile grown plants, the sugars in the herbage will not undergo any deterioration or in any case, only to a very slight extent. In a parallel way, acidification in the forage only increases very slightly.

(8) By adding pure cultures of acidifying microbes to sterile grown herbage, a rapid and vigorous acidification results.

From these affirmations, it may be concluded that the true acidification agents of forage are the *vegetal acidifying micro-organismes* indicated above.

The experimental results just described have made it possible to attack *ex-novo* the problem of conserving fresh forage so as to specify the fundamental conditions on which successful results depend.

The experiments carried out have elucidated the phenomena formerly either little known or not considered important:

(1) The development of acidifying bacteria should take place as rapidly as possible. The mechanical treatment of forage (chopping or defibrage) is a

very effective means of obtaining this result. It also has the important advantage of facilitating stacking in the silos and the compression of the herbage. In the case of very succulent herbage, this mechanical treatment enables a more rapid elimination of the excess juice.

(2) All increment in temperature, besides stimulating oxidization, causes poor silage, as it accelerates the breakdown of the nitrogenous substances and also butyric fermentation. Therefore, high temperatures must be avoided.

(3) Another cause of spoilage is the unevenness and differences in the ensiled mass; heterogeneity is particularly likely to occur with very succulent and wet herbage and should be eliminated as far as possible by mechanical treatment and careful stacking of the forage and by rapid drainage of the excess liquid.

(4) The herbage should contain an adequate quantity of sugars for the production of the acids; the addition of molasses at the rate of 1-2 per cent. is very advantageous for fodders with a low sugar content.

(5) As has long been known, the ensiled mass must be kept as far as possible from all contact with the air.

Practical rules

From these conclusions, the following rules have been drawn:

(A) Depending on weather conditions, it is better to ensile herbage which is not wet (rain, irrigation water, etc.) and preferably after wilting; good results are more certain and loss in nutrients is reduced.

(B) Forage plants to be ensiled after harvesting should not be left out in the open for long periods and should be left as little as possible in the hay wagons, that is, there should be no delay between harvesting, transport and ensilage.

(C) It is advisable to chop or defibre the forage.

(D) The herbage should be stacked and pressed into the silo as carefully as possible in order to obtain a compact and uniform mass; a pressure of at least 4-5 quintals per square metre.

(E) In filling the silo, if this operation cannot be carried out without interruption, care should be taken to avoid exposing the ensiled mass to prolonged contact with the air. After the silo is filled, the surface layer of the silage should be protected by means of a hermetically closing compression cover or by covering the silage with a layer of earth 40-50 cm. deep.

(F) With forage plants less easy to ensile, there is greater probability of good results if 1-2 per cent. of molasses is added to the ensiled mass. The molasses should be added after the silo is filled, distributing the required quantity slightly diluted in order to reduce viscosity, over the surface of the ensiled mass.

For very succulent herbage or plants harvested when wet, the following precautions have to be taken:

(G) Use of silos with drainage pits, sumps or other devices for the removal of excess liquid. It is advisable to place a layer of faggots and straw at the bottom of the silo to facilitate and accelerate drainage.

(H) Silage should not be stacked too high, if possible not higher than three metres.

(I) The forage plants to be ensiled should be as uniform as possible. Stacking different types of forage in successive layers should be avoided. If different types have to be used, they should be mixed after mechanical treatment.

(J) In the hot season particularly, the silo should be loaded as rapidly as possible and without interruption, in one or at the most, in two consecutive days.

In spring and autumn, that is to say when the temperature is relatively low, the ensilage system based on acid fermentation, rationally applied, can give highly satisfactory results, and the rules indicated above are easily followed.

With the acid fermentation method, it is possible to conserve even easily injured plants such as clover. This system, therefore, appears to solve the problem of fodder storage satisfactorily when weather conditions make haymaking or silo hay impossible.

CARLO ARNAUDI

*Director of the Institute of Agricultural
and Technical Microbiology,
Royal University of Milan
and Director of the Experiment Station
of Bacteriology at Crema.*

Bibliography:

1. BABCOCK, S. M., u. RUSSELL, H. L., Die bei der Herstellung von Grünfutter (Silage) wirkenden Ursachen. *Centr. j. Bakt.*, II Abt., Bd. 9, 3/4, 81, 1902.
2. HANSEN, S. H., Les processus biochimiques dans l'ensilage des fourrages verts. *Norges Landbrukshøiskole*, 25. Beretning, p. 58, 1920.
3. PRATOLONGO U., L'infossamento dei foraggi. Aspetti biochimici e tecnici. *Atti R. Acc. d. Georgofili*, 1939.
4. CURIN, B., O puvodu kyseliny mléčné v. silazi. *Sborník Vědeckých ústavů Zemědělských Č. S. R.*, Vol. 96, Praha, 1932.
5. ARNAUDI, C., et POLITI, I., Quelques observations à propos des procès d'acidification des fourrages ensilés. *Boll. Soc. Int. Micr.*, Sez. It., 1939.
6. POLITI, I., I processi di acidificazione dei foraggi insilati. (Erscheint demnächst).
7. GORINI, C., Ueber die Mikroflora des italienischen Silofutters. (Milchsäure-Ensilage). *Milchwirtsch. Forschungen*, Bd. 7, S. 254, 1920.
8. KAISER, M., L'acide lactique dans l'ensilage. *1^{er} Congrès Int. de l'ens. des fourrages*, Toulouse, 1927.
9. ALLEN, J. A., HARRISON, S. J., WATSON, FERGUSON, W. S., The effect of the addition of various materials and bacterial cultures to grass silage at the time of making on the subsequent bacterial and chemical changes. *Journ. of Agric. Science*, 27, II, p. 291, 1937.
10. VAN BEYNUM, J., en PETTE, J. W., Bacteriologische onderzoeken over ensileering met toevoeging van zure wei onder melk of suiker. *Rijkslandbouwprouffstation K. Hoorn*, 1936.
11. VIRTANEN, A. I., The microbiology of ensilage production. *Actes de 2^{ème} Congrès Int. Microbiologie*, 1936.
12. CUNNINGHAM, et SMITH., Communication faite à la Société de Bactériologie agricole de Edimbourg, 1935.
13. POLITI, I., Ricerche sopra i foraggi insilati. Nota I.
POLITI, I., Ricerche sui foraggi insilati. Nota II (Sui microorganismi acidificanti).
POLITI, I., Ricerche sui foraggi insilati. Nota IV (Sui processi fermentativi dei foraggi insilati allo stato verde). Ed. Biazzi, Milano, 1939.
14. ARNAUDI, C., Ricerche sui microrganismi acidificanti dei foraggi insilati. *R. Acc. Naz. dei Lincei*, vol. XXVIII, 5/6, 1938.
15. SELLIERE, G., Sur la digestion de la xylane chez les mammifères. *C. R. Soc. Biol.*, LXVI, 1909.

SORGO **(continued)***Nutrient requirements**

In studying the nutrient requirements of sorgo, it should be remembered that the aerial part of the plant develops very slowly during the first part of its vegetative cycle. In the course of experiments carried out over a period of several years, A. T. BARTELL and J. H. MARTIN found that after 54 days, *i. e.*, at about half the period required to attain full maturity, the weight of the aerial parts of the plant only represented from 10 to 15 per cent. of the total weight of the harvested crop.

According to JOULIE, cited by Prof. E. PARISI, a good crop of sorgo yielding 500 qls. (50,000 kg.) of cane and 50 qls. of grain, would represent approximately 100 kg. of phosphoric acid, 200 kg. of potash and 300 kg. of nitrogen. The crop yield taken as a basis by JOULIE appears rather high, but this does not detract from the fact that sorgo absorbs large quantities of nutrients from the soil, in particular nitrogen and potash. Part of these elements are obtained from the subsoil, and J. P. CONRAD observed that sorgo could even take up nitrogen 10 feet below soil level.

The greater part of the plant nutrients are absorbed during the first part of the vegetative cycle. In comparison with absorption of phosphoric acid, that of nitrogen and calcium varies but slightly during growth, while that of potash increases progressively. Nitrogen and phosphoric acid appear to be important chiefly for the synthesis of the albumin, while potash is indispensable for sugar accumulation.

In brief, sorgo requires large amounts of nitrogen and phosphoric acid during the first period of growth to form organic matter such as protein — absorption of these nutrients attains a maximum at the beginning of the flowering stage — and then potash. During the second half of the vegetative cycle, the increase in dry matter signifies chiefly a corresponding rise in carbohydrates. Potash increases resistance to low temperatures, stimulates the production of dry matter and the accumulation of carbohydrates, and directs the reaction towards the formation of saccharose with a corresponding decrease in reducing sugars.

Prussic acid in sorghums

Up to the beginning of maturity, the youngest parts of sorgo contain a glucoside called 'Dhurrine' by W. R. DUNSTAN; as the plant matures, the glucoside content decreases. This glucoside is hydrolized by emulsin or by dilute

* See this *Bulletin*, 1940, No. 10, p. 331.

acids to produce hydrocyanic acid. This is the cause of stock-poisoning frequently observed when young sorgo is grazed or given as feed.

Apart from its possible function, some information on the distribution of this glucoside in the sorgo plant will be of interest.

Hydrocyanic acid appears soon after germination, increases rapidly in the young plant, then gradually decreases and finally disappears when the grain begins to form its food reserve. During the first three or four weeks of plant growth, HCN is concentrated in the stalks, afterwards it decreases rapidly, although traces are still found in the leaves, finally disappearing as the plant attains maturity. There is relatively less HCN in thick healthy stems than in straggly stems. The upper leaves contain more HCN than the lower, older leaves. The part of the leaf nearest the stem contains more HCN than the other part, and the lamina shows a higher content than the central nervure. More HCN is found in the secondary stems than in the main stalk, and more in the lateral ramifications than in the main stem.

Sorghums grown in soil with a high nitrogen content or given applications of nitrogen fertilizer contain larger amounts of hydrocyanic acid. This effect of nitrogenous fertilizers is particularly marked in poor and infertile soil.

Some observers have found little or no HCN in yellowish or yellowish-green sorghum plants. Others have reported that sickly plants contain more HCN than healthy plants, the poor condition of the plants possibly being due to inadequate nutrient supply or transpiration, to insect attack or other causes.

In Italy, in the spring of 1938, owing to drought and cold, the sorgo crops began to turn yellow. Some days later, plant-lice appeared and within 40 hours had infested the lower leaf surface of the yellowing plants, the plants which were still green being hardly touched. Dr. CORNOLDI of the Bottrighe Plant Breeding Station found that in the yellowing plants, the HCN content had dropped and represented only about 1/10 of that of the green plants. With the coming of the rains, the plants began to recover their greenness, and at the same time, the aphides disappeared.

Different investigators consider that the HCN content of sorgo plants varies according to climatic conditions and to variety.

Effect of 'sorghums' on subsequent crops

Most observers agree that sorghums have an adverse effect on subsequent crops, reducing yields by 10 to 15 per cent. and sometimes more. At the Kansas Experiment Stations for example, wheat, on an average for six years produced three bushels less grain per acre than when grown after maize. This reduction in yield is sometimes so high that a year's fallow is necessary to restore soil fertility. All crops, however, do not suffer to the same extent. Winter cereals sown immediately after harvesting the sorghum are chiefly affected, legumes not at all.

Various explanations of this after-effect have been suggested. It is said that sorghums exhaust the moisture and nutrient content of the soil. Cultivated

without irrigation, sorghums can, in fact, reduce the soil moisture to the level of the coefficient of wilting in a much deeper layer of soil than other crops. If the rains which follow are insufficient, there will be a layer of dry soil interposed between the moist surface layer and the moist subsoil.

The poor physical condition of the soil is said to be another cause. The many fibrous roots of the sorghum plant make ploughing difficult, leaving the soil in large sods slow to crumble. These causes, however, do not fully explain the after-effect of sorghums.

M. C. SEWELL of the Kansas Experiment Station reports that drainage water from land formerly under sorghum used to irrigate wheat had an adverse effect on the growth of this crop; this does not occur when drainage water from maize fields is used. M. C. SEWELL concluded that the drainage water contained toxic decomposition products formed by the sorghum stubble in the soil, thus damaging the wheat.

J. F. BREAZEALE, using water cultures, found that decomposed sorghum stubble checked wheat growth, indicating the presence of a toxic body formed by the decomposition of the stubble. This toxic substance appears to decompose or volatilize rapidly. While this substance remains in the soil, most of the carbonic acid producing flora are destroyed and the check in the evolution of CO₂ would produce a new equilibrium with the formation of sodium zeolites, whence the deflocculation of the soil.

From experiments and investigations carried out, J. P. CONRAD suggests another explanation which, for the moment, appears the most satisfactory. Sorghum stubble and roots contain a large amount of sugars; their decomposition leads to the development of a particularly active microbial flora which competes with cultivated plants for the nitrogen and other nutrients in the soil, resulting in an inadequate supply of one or more nutrients available to the plant. This competition only ends when all the easily decomposable carbohydrates are destroyed. B. D. WILSON and J. K. WILSON observed that in cultures made with soils containing sorghum roots or ground maize, nitrogen disappeared more rapidly in the first case. Here also, the after-effect of sorghums is considered to depend on the facility with which the roots are oxidized in the soil. This process leads to an increase in the number of micro-organisms and a more active absorption of nitric nitrogen, thus reducing the quantity of assimilable nitrogen in the soil, at the time when it is required by the young plants.

The quantity of sugar contained in sorghum roots varies according to variety and climatological conditions. In 1927, J. P. CONRAD found the following quantities of sugar, expressed as saccharose per cent. of organic dry matter: maize roots: 0.12 to 4.58 per cent.; Honey sorgo: 55.4 per cent.; Early Amber sorgo: 51 per cent.; grain sorghum: 15.9 to 54.3 per cent. In other experiments carried out with and without irrigation, the sugar content of King Philip Hybrid maize, with one exception, decreased from 8.5-18 per cent. at the time of flowering to below 2 per cent. at maturity. In sorghums, on the contrary, in most cases the sugar content remained over 16 per cent. from flowering to maturity, some plants showing over 30 per cent.

J. C. CONRAD not only tested the roots but also took samples of the soil in the field with a view to determining the content of sugar and its distribution. He found that the top inch layer of soil within a radius of four inches about the plant contained 12,000 parts of sugar per million parts of soil, while the tenth layer only contained about 10 parts. He estimated that the quantity of sugar existing in a layer of soil one foot deep and one acre in area amounts to 550 lb. after cropping with Honey sorgo, 200 lb. after Double Dwarf milo, and only 35 lb. after maize.

In pot experiments, with the addition of increasing quantities of sorghum roots and proportional quantities of sucrose, yield of barley fell progressively in both cases and, in the uncropped pots, the nitrates in the soil decreased progressively. There was a close connexion between the decrease caused by sorghum roots and that due to the addition of an equivalent amount of sucrose, and in the same way, between the yield of barley and decrease in nitrates.

Small cereals grown after sorghums derive considerable benefit from the application of nitrogenous fertilizers and show an increase in yield in proportion to the quantity applied. At Davis (California), following a sorghum crop, barley gave 1225 lb. of grain per acre. Applications of nitrate of soda at the rate of 100, 200 and 400 lb. increased this yield by 810, 1125 and 1495 lb. respectively. In Imperial Valley, applications of 200 and 400 lb. of sulphate of ammonia per acre to wheat and barley sown after Hegari grain sorghum, produced appreciable increases in yield. All applications of 400 lb. of fertilizer and some of 200 lb. more than doubled yield of barley. In general, the best results were obtained by applying the fertilizer 35 to 67 days after sowing.

In brief, the adverse after-effect of sorghums may be explained either by temporary exhaustion of the soil, or by competition of the micro-organisms which develop profusely from the sugars contained in the stubble and roots, or by a combination of these two hypotheses.

With a view to obviating this after-effect, J. P. CONRAD suggests reducing the quantity of sugar dug into the soil by grazing the field after cropping or by removing the stubble and roots; cultivating varieties with a low sugar content; accelerating decomposition of roots; sowing a good crop of legumes after sorghum. Particular attention should be given to manuring, not only of the sorghum crop, but also of the successive crop.

Composition of sorgo juice

The composition of sorgo juice depends on certain factors such as variety, season, degree of maturity, geographical situation, climatic conditions, cultivation methods, etc. The composition of the juice varies in the different parts of the plant.

Sugars. — The sugar contained in sorgo is in the form of saccharose and reducing sugars.

Influence of varieties. — See table below.

Analyses of the juice of different sorgo varieties made in 1910.

(according to A. H. BRYAN)

| Varieties | Density Baumé | | Sucrose % | | Invert sugar % | | Total sugar % | |
|---------------------------|---------------|------|-----------|-------|----------------|-------|---------------|-------|
| | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| Sumac | 8.0 | 10.6 | 2.88 | 11.34 | 3.21 | 10.90 | 10.96 | 14.83 |
| Planters | 7.3 | 12.6 | 2.98 | 15.38 | 1.74 | 11.69 | 9.71 | 17.31 |
| Red Amber | 6.3 | 11.9 | 0.75 | 9.57 | 2.72 | 14.46 | 8.20 | 15.89 |
| Minnesota Amber | 7.2 | 10.7 | 3.54 | 13.00 | 1.72 | 11.40 | 7.72 | 15.66 |
| Honey | 8.3 | 11.6 | 1.73 | 12.59 | 1.50 | 13.57 | 11.44 | 17.15 |
| Orange | 6.2 | 12.7 | 1.06 | 15.53 | 1.88 | 14.62 | 7.42 | 16.28 |
| Gooseneck | 8.5 | 10.5 | 3.84 | 10.48 | 2.91 | 8.80 | 10.30 | 15.11 |
| Colman | 11.2 | 11.9 | 13.79 | 15.30 | 1.12 | 1.93 | 14.91 | 16.58 |
| Collier | 10.9 | 14.0 | 12.14 | 18.39 | 0.61 | 2.12 | 14.26 | 19.00 |

These figures may be compared with more recent results obtained in Italy:

*Experiments carried out in 1938 in the Ferrara region
on organic mineral, fertile soil.*

(according to A. ALDOVRANDI)

| Varieties | Total sugar after inversion % of stripped stalks |
|-------------------------|---|
| Bondeno R. 32 | 14.25 |
| Bondeno R. 32 | 14.00 |
| Kansas-Oran | 11.40 |
| Sugar Drip | 12.06 |
| Honey | 12.06 |
| Honey | 12.92 |
| Black Amber | 12.14 |
| Orange | 11.68 |
| Red Amber | 11.02 |
| Minnesota | 12.35 |

F. MASSA also cites the results obtained the same year in the Provinces of Ravenna and Ferrara.

| Varieties | Total sugar % of stripped cane expressed in saccharose |
|--|---|
| <i>Soils of medium consistency.</i> | |
| Rosso Lombardo | 14.15 |
| Kansas Orange | 11.33 |
| <i>Peaty soils.</i> | |
| Rosso Lombardo | 14.05 |
| Kansas Orange | 12.20 |
| <i>Soils of medium consistency, fertile.</i> | |
| Rosso Lombardo | 14.9 |
| Kansas Orange | 11.49 |
| Sugar Drip | 12.16 |
| Honey | 12.35 |
| Black Amber | 12.20 |
| Orange | 12.05 |
| Atlas | 10.85 |
| Red Amber | 11.96 |
| Minnesota | 12.22 |

The above figures given by different authors are not directly comparable; A. H. BRYAN gives the sugar content of the juice, and the other two, the sugar content of the stalks. On the other hand, A. H. BRYAN merely adds the saccharose and the reducing sugars to obtain the total sugar. A. ALDOVRANDI indicates the total sugar after inversion and F. MASSA expresses it in saccharose.

Influence of degree of maturity

The influence of degree of maturity has been extensively studied. When attempts were first made to obtain sugar from sorgo, the chief problem was to determine at what period of growth the plant contained a maximum of saccharose and a minimum of reducing sugars; at present in the United States, the aim is to harvest the crop when the proportion of invert sucrose is such that the risk of the syrup crystallizing is minimum. In Italy, besides the grain, a maximum of sugar, invert sugar or sucrose, is desired, the sap being intended solely for fermentation, the purity being less important.

Sugar content of sorgo sap at different periods of growth.

(According to P. COLLIER, 1885: average of 2740 analyses).

| Stage of growth | Saccharose % | Invert sugars % |
|---------------------------------------|-----------------|--------------------|
| Emergence of panicles | 3.51 | 4.50 |
| Panicles completely emerged | 5.13 | 4.15 |
| In full bloom | 7.38 | 3.86 |
| Grain: | | |
| milky stage | 8.15 | 3.19 |
| waxy, beginning to dry | 10.66 | 2.35 |
| dry, breaking easily | 11.40 | 2.03 |
| hard | 13.72 | 1.56 |

Subsequent analyses confirmed the results of COLLIER. J. J. WILLAMAN and his collaborators conclude from their analyses that when the panicle emerges the content of reducing sugars is higher than that of saccharose. The former decrease rapidly while the latter increases up to the full bloom stage when they are approximately equal. This movement continues up to maturity when the saccharose/reducing sugars ratio is about 70/30 in the case of sorgo cane grown in Minnesota. In very ripe cane cultivated in Virginia, this ratio may attain and even exceed 90/10.

In the Ferrara region (Italy) in 1938, A. ALDOVRANDI obtained the following results, showing the variation in sugar content.

Analyses continued every 15 days showed a decrease in the sugar content during the first ten days of December. This phenomenon, already observed in previous years when the crops were still in the field at this period, is confirmed by the results obtained on industrial extraction: yields were lower. A. ALDOVRANDI suggests that retrogression begins when the temperature falls below 19°C. This temperature is necessary for the plant both for ripening and for its

Variation in sugar content of Bondeno R 32 sorgo in 1938.

| | Sugar content of the pulp after diastasic inversion | | | | | | |
|--|---|---------|----------|--------|--------|---------|---------|
| | Aug. 18 | Sept. 2 | Sept. 16 | Oct. 2 | Oct. 8 | Oct. 15 | Oct. 20 |
| | % | % | % | % | % | % | % |
| <i>Dry peaty soil</i> | | | | | | | |
| Crop free from aphides . . . | 8.14 | — | 15.52 | 19.40 | — | 14.31 | — |
| Crop attacked by aphides . . | 11.64 | 12.06 | 16.40 | 16.60 | 13.95 | 13.47 | — |
| <i>Irrigated peaty ricefield soil</i> | | | | | | | |
| Crop attacked by aphides . . | 7.83 | 12 | 13.66 | 15.4 | 15.25 | — | 13.38 |
| Crop heavily infested with aphides | 4.89 | 8.10 | 11 | 14.3 | 15.23 | — | 14.76 |

early growth. If the external temperature is not at the right degree, the grain ripens at the expense of the sugar contained in the stalk, in consequence of the check in the process of assimilation and photosynthesis.

Effect of frost on composition of the juice

A heavy frost occurring before ripening or a succession of even slight reductions in temperature, affects the vitality of the plant causing injury usually accompanied by a partial inversion of the sucrose into dextrose and laevulose and an increase in impurities in the juice. On heating, the juice emits a noxious odour and is unsuitable for syrup manufacture. The extent of frost injury depends on stage of maturity, the ripest canes being the least affected.

The average figures of 26 varieties analyzed just before and just after heavy frost showed the following differences (U. S. Dept. Agr. Rpt. 1881-82, pp. 459-460).

| | Before frost | After frost |
|---|-----------------|-----------------|
| Juice extracted | 54.82 per cent. | 58.09 per cent. |
| Sucrose in the juice | 15.28 „ „ | 12.91 „ „ |
| Invert sugars in the juice | 1.41 „ „ | 1.82 „ „ |
| Non-sugar solids in the juice | 3.36 „ „ | 4.00 „ „ |

Composition of the juice in different parts of the stalk

The composition of the juice is not homogeneous throughout the plant. Since JOULIE, numerous investigations have been carried out on this variation in composition. The aim of these studies was to determine the parts of the plant most suitable either for the extraction of the sucrose or for the manufacture of high grade syrup. When sorgo is cultivated for alcohol, however, the distribution of the sucrose in the plant is not so important.

In general, the content of solids dissolved in the juice increases with maturity and also progressively from the first internode (the internodes are counted from the top) up to a maximum in the 3rd or 4th, followed by a progressive decrease

in the lower internodes. There is a close relation between the percentage of solids dissolved and the percentage of the weight of each internode. The saccharose content increases from the first internode, attaining a maximum in the 3rd or 4th and shows a decided progressive decrease in the lower internodes. In the same way, as the plant matures, the saccharose increases in all the internodes. If the sucrose is to be extracted, the lower part of the stalk should be removed as it has a coefficient of purity lower than the limit practicable for the crystallization of the sucrose. On the other hand, in syrup manufacture, the removal of the top three or four internodes reduces the tendency of the saccharose to crystallize and gives a less acid syrup.

*Percentage of juice and solids
in solution in the different parts of sorgo stalk.*

| Varieties | 3 lower internodes | | Middle internodes | | 3 upper internodes | | Peduncle | |
|----------------------------------|--------------------|------------------|-------------------|------------------|--------------------|------------------|-----------------|------------------|
| | juice extracted | density of juice | juice extracted | density of juice | juice extracted | density of juice | juice extracted | density of juice |
| | % | Brix | % | Brix | % | Brix | % | Brix |
| Red X ⁽¹⁾ | 49.18 | 20.26 | 54.13 | 20.36 | 47.82 | 19.83 | 43.54 | 14.71 |
| Sapling ⁽¹⁾ | 52.19 | 17.27 | 55.77 | 16.66 | 53.84 | 14.26 | 44.87 | 10.47 |
| Indiana Amber ⁽²⁾ . . | 60.49 | 9.48 | 63.72 | 9.56 | 62.05 | 9.53 | 47.36 | 8.80 |
| Average | 53.05 | 15.67 | 58.54 | 15.53 | 54.57 | 14.54 | 45.26 | 11.35 |

(¹) Hard grain. — (²) Grain in milky stage.

Peduncle

In syrup manufacture, the upper nodes and in particular the peduncle are rejected. In the manufacture of alcohol, only the peduncle is considered unsuitable. A. ALDOVRANDI, however, regards this as a mistake. The peduncle represents 8 to 10 per cent. of the weight of utilizable cane; it contains less juice than the rest of the stalk, but can be treated industrially in the same way. Over

| Varieties | Period | Brix density | | |
|-------------------------|--------------------|----------------|---------------------------|----------|
| | | Middle of cane | Last utilizable internode | Peduncle |
| Bondeno R. 32 | September 22, 1937 | 18.44 | 16.0 | 14.9 |
| Black Amber | " " | 16.56 | 13.50 | 13.1 |
| Honey | " " | 17.10 | 15.1 | 14.0 |
| Bondeno R. 32 | August 18, 1938 | 18.96 | 20.4 | 21.0 |
| Bondeno R. 32 | September 4, 1938 | 9.60 | 12.2 | 12.5 |
| Bondeno R. 32 | October 6, 1938 | 19.58 | 20.90 | 20.40 |
| Kansas Oran | " " | 13.41 | 13.0 | 12.90 |
| Importata | " " | 11.92 | 14.20 | 14.0 |

50 years ago, Prof. MONSELISE found that the sugars contained in the peduncle were composed chiefly of glucose, which checks saccharose crystallization. The chief object at present being the manufacture of alcohol, this discrimination would no longer be justified by the difference between the last utilizable internode and the peduncle. The following are some of the analytical results cited by A. ALDOVRANDI. (See table at foot of p. 389).

Roots

It has already been mentioned that according to J. C. CONRAD, sorghum roots contain up to 55 per cent. sugar in the dry matter. In light or peaty soils, removal of the roots is fairly simple and inexpensive by means of the plough or weed grubbers. The quantity of root which may be removed amounts to 5000-6000 kg. per hectare, and, therefore, should be taken into account. After washing, the roots may be used for alcohol manufacture or for stock-feed. They have also been suggested as a substitute for coffee. Any of these utilizations would have the additional advantage of reducing the adverse effect of sorghums on successive crops. In the following table, A. ALDOVRANDI compares the composition of the stalks and the roots.

Variety: Bondeno R 32. Analyses made on October 6, 1938.

| Stalks | | | Roots | | | |
|-----------------------|-------|---|-------------------------------|--------------------------|-------|---|
| Weight grams | Brix | Total sugar after diastasic inversion % | Weight with attached soil gm. | Weight after washing gm. | Brix | Total sugar after diastasic inversion % |
| Irrigated peaty soils | | | | | | |
| 411 | 21.20 | 15.25 | 509 | 164 | 16.50 | 10.12 |
| 370 | 21.20 | 15.25 | 314 | 80 | 16.50 | 12.45 |
| 450 | 18.20 | 14.09 | 303 | 110 | 16.50 | 11.80 |
| 500 | 16.30 | 13.14 | 427 | 99 | 16.50 | 10.35 |
| Dry peaty soils | | | | | | |
| 380 | 18.40 | 13.95 | 229 | 94 | 16 | 11.03 |
| 300 | 17.20 | 12.45 | 116 | 60 | 16.60 | 10.51 |

The non-sugar solids in the juice

The non-sugar solids in the juice precipitated by alcohol include (a) proteins; (b) cellular matter resulting from crushing in the mill; (c) true gums. These gums appear to be compounds of galactans and pentosans with approximately 20 per cent. mineral matter, chiefly calcium, magnesium and potash. A considerable part of the nitrogenous matter is non-proteinic (amidic), even in the ripe cane, which causes difficulty in juice clarification.

The acids found in sorgho juice are aconitic, malic, citric, tartaric and oxalic; in general, acidity varies according to degree of maturity. The following table (by E. K. VENTRE and S. BYALL) indicates the localization of the acids in the different internodes at different stages of maturity.

Gooseneck variety. Acidity expressed in cm³ of N/10 NaOH required to neutralize 10 cm³ of juice.

| Number of internodes beginning from the top | grain in milky stage | grain waxy | grain hard |
|---|----------------------|------------|------------|
| 1 | 3.2 | 3.9 | 4.4 |
| 2 | 2.5 | 3.0 | 3.8 |
| 3 | 1.5 | 2.2 | 2.9 |
| 4 | 1.4 | 1.5 | 2.5 |
| 5 | 0.8 | 1.5 | 2.2 |
| 6 | 0.7 | 1.4 | 2.0 |
| 7 | 0.7 | 1.2 | 1.9 |
| 8 | 0.7 | 1.1 | 1.8 |
| 9 | 0.7 | 1.1 | 1.8 |
| 10 | 0.7 | 1.1 | 1.7 |
| 11 | 0.8 | 1.0 | 1.5 |
| 12 | 0.8 | 0.9 | 1.5 |
| Whole stalk | — | 1.6 | 2.1 |

In the Gosseneck variety, therefore, acidity increases in all internodes on maturity. The same in the Iceberg variety. In the Hodo variety, average acidity increases on maturity, while it remains practically stationary in Honey sorgo. It seems, however, that in all varieties, acidity is appreciably higher in the upper internodes; this affects the quality of the syrup.

Since JOULIE'S studies, it has been found that sorgo juice may contain more than traces of starch (0.1 per cent.).

(to be continued).

A. HANCK

NEW ASPECTS ON THE DRYING AND DISINFECTION OF CEREALS

The effective disinfection and storage of grain stocks and many other agricultural products is of the highest economic importance. In this article, the best systems of drying and disinfection are briefly reviewed, with special reference to the physical methods, often preferable to the usual processes of disinfection by chemical means.

Among the physical methods mentioned, the system of simultaneous disinfection and drying by means of infra-red radiation — which gives very good results — is treated in more detail.

Introduction

The problem of storing agricultural products in general, and cereals in particular, is of especial importance to-day. Up to the present, the losses occurring in grain during storage were considered as more or less serious, but not vital problems. To-day the Governments are giving much more attention to these pro-

blems because, if losses can be prevented, the grain stocks in practically all countries, from this saving alone, would increase by 5 to 10 per cent. Many investigators consider that the losses due to carelessness, incorrect storage conditions, animal and plant pests, humidity and respiration amount to round about these figures. For example, VOROBIEV (U. S. S. R.) estimates wheat losses during storage at 5 per cent., MOHS (Germany) calculates grain (wheat, rye, oats, barley) losses through insects or rodents at about 4 per cent., and losses due to respiration and plant parasites at 5 per cent.

Factors causing losses during storage

Besides losses due to carelessness and bad storage methods, the primary fact to be remembered is that grain is a living organism subject to various changes, and that throughout the storage period, chemical changes are continually taking place.

Among these, mention may be made of the changes caused by respiratory action and enzyme activity. Both are directly connected with humidity and temperature.

(a) Respiration.

Respiration being a combustion process, the grain, in carrying out this function, has to consume part of its food reserve. Degree of humidity and of heat directly affect intensity of respiration. HOFFMANN in his investigations on this effect obtained the following results:

Influence of temperature: 1 kg. of grain having a 14-15 per cent. moisture content, in 24 hours evolves:

| | |
|--------------------|----------------------------|
| at 18° C | 1.4 mg. (CO ₂) |
| „ 30° C | 7.5 „ „ |
| „ 40° C | 20-40 „ „ |
| „ 52° C | 249 „ „ |

Influence of humidity: In 24 hours, 1 kg. of grain at 18°C. with a moisture content of

| | |
|----------------------------------|-----------------------------|
| 11.0 per cent. evolves | 0.35 mg. (CO ₂) |
| 14-15 „ „ „ | 1.40 „ „ |
| 19.6 „ „ „ | 123.00 „ „ |
| 20.5 „ „ „ | 339.00 „ „ |
| 30.0 „ „ „ | 2000.00 „ „ |

These figures show that to reduce losses due to respiratory action, the moisture content of the grain must be lowered and the temperature kept within a certain limit.

As the grain respire and as respiration is a combustion process, an evolution of calories proportional to the intensity of this physiological function and heating of the grain naturally takes place. The greater the factors which stimulate and accelerate respiration (in particular, humidity), the greater is this auto-heating.

If the necessary precautions are not taken during storage, humidity may cause the temperature in the centre of the grain heap to rise to 40°C. and over.

At this temperature, the possibility of conserving the grain is considerably reduced and, if it should rise above 65°C., the germinative power will also be greatly lowered if not entirely destroyed. Auto-heating also causes radical changes in the gluten, thus affecting the value of the flour and baking qualities.

(b) *Enzyme activity.*

During the rest period, enzyme activity is reduced to a minimum, though it still continues to exist. That enzymatic changes take place is evident, chiefly from the fact that the germinative power only attains its maximum after a certain period of storage, and that fresh grain, as regards both milling and panification, is inferior to grain which has been stored for a certain time. It should be noted, however, that in ripe grain, enzyme activity tends to break down the substances of high molecular weight in the grain, *i. e.*, the proteins and carbohydrates and thus affects baking qualities. The causes which stimulate this activity of the enzymes, including humidity and in particular temperature, therefore, should be eliminated.

When the grain is at the harvesting stage, its moisture content is about 30 per cent., but falls rapidly to 12-18 per cent. if left to dry on the field in fine weather; in wet weather, however, the moisture content is much higher, varying from 19 to 24 per cent. Consequently, enzyme activity is appreciably higher and stimulates germination. Further quantities of enzymes are formed, thus accelerating the break-down process. Grain in this state, naturally is no longer suitable for panification or can only be used with difficulty. Hence, the moisture content of the grain should be rigorously checked before storage.

Besides these two main factors, respiratory and enzyme activity, closely linked, so to speak, with the vitality itself of the grain, and which, by their nature, can never be entirely suppressed but only limited, account must also be taken of the plant and animal pests which attack grain during storage.

(c) *Plant parasites and animal pests attacking stored grain.*

Stored grain is subject to the attack of plant (fungi and bacteria) and animal (insects, rodents) pests; losses are considerable. In the case of plant parasites, the moist grain is easily attacked by moulds which concentrate on the nucleus or the fissures later penetrating to the centre. The most common cereal moulds are of the *Penicillium*, *Aspergillus*, *Fusarium*, *Alternaria* and other genera. Cereals attacked by mould have a characteristic odour which can be eliminated by special treatments, but nothing can be done about the chemico-biological changes. Black or white moulds, therefore, depreciate cereals considerably.

Of the different bacteria, *Bacillus mesentericus* is the most serious owing to the difficulties it causes in the panification of infested flour.

Besides the damage caused by plant parasites, serious damage is also produced by animal pests, especially insects. The chief of these as regards wheat is the corn weevil (*Calandra granaria*).

The rice weevil (*C. oryzae*) attacks chiefly rice and macaroni, spaghetti, etc.

The Reich Institute of Biology calculated that, in Germany, weevils destroyed cereals to the value of about 100 million marks, corresponding to 600,000 tons out of an annual crop of 20 million tons (thus, a loss of approximately 3 per cent. is due to this insect alone).

Through its respiration, the weevil causes considerable heating of the grain heap, and its excrements add to the damage done.

BACK and COTTON found that one female insect could lay as many as 254 eggs, the minimum being 36. If the stored cereal is left untouched, the female will produce a first generation in July of 25 descendants, a second in September of 325 and a third in October of possibly – if the weather is very warm – 4000.

Normally, two generations are produced in a year and four when conditions are exceptionally favourable. The maximum duration of the life of the insect is two years.

To show the seriousness of weevil infestation, 110 quintals of infested wheat were placed in an ordinary granary and left untouched for six weeks. A thorough ventilation and cleaning was then carried out and the wheat weighed; there was a loss of 30 qls., i. e., 27 per cent. of the wheat stored.

Badly infested grain gives a malodorous flour which is not suitable for panification and injurious to the health.

Tenebrioides mauritanicus is another pest of cereals, especially wheat; this beetle also attacks flour, bread, macaroni and similar cereal products and biscuits. The female, most prolific of all species known, may lay up to 1200 eggs. This beetle usually attacks the wheat embryo and thus is especially dangerous to seed grain.

Among the Lepidoptera, mention may be made of *Tinea granella* a small moth which attacks barley and wheat and also maize. The damage caused is not so much due to direct destruction, but chiefly to the filaments formed. One female may produce up to 100 progeny at a time.

Ephestia kühniella, another formidable pest indigenous to America, to-day is found not only throughout Europe, but also in South Africa and Australia. This beetle attacks both grain and flour (by spinning its filaments in the latter and forming lumps). According to HAASE, cited by ZACHER, one individual can spoil:

| | |
|---------|---------------------|
| 100-300 | mg. of wheat grain; |
| 190-330 | » of broken rice; |
| 400 | » of maize; |
| 85-90 | » of semolina; |
| 70 | » of oat flakes; |
| 40-50 | » of wheat flour. |

Another pest, *Sitotroga cerealella*, indigenous to America and known as the Angoumois grain moth, attacks maize, rye, wheat, barley and different legumes, chiefly beans and peas. It is common on plants in the warm temperate zone and in tropical regions, while in cold areas, it is only found in warehouses.

The loss of nuclear substance in wheat may amount to 56 per cent., and in maize from 13 to 24 per cent.

Plodia interpunctella is a small moth which attacks the nucleus from the outside; sometimes several grains are attacked and bound together by very fine filaments. The excrements of this insect give the cereal a repellant odour, making it unfit for food.

Among the Arachnida, mention should be made of some mites which are very dangerous as regards the hygienic viewpoint. Maize infested with these mites is unfit for human nutrition and may cause disorders even in animals; horses are very susceptible to mite-infested grain which in some cases may even cause death.

Chief of these mites are *Aleurobius farinae* and *Glyciphagus domesticus*.

In general, thoroughly dry grain is not attacked, owing to its greater resistance; but if the grain is bruised or attacked by other parasites, the mite penetrates into the interior and devours first the embryo and the neighbouring area, then the farinaceous part of the nucleus. The quality of the flour is highly depreciated through the excrements of these insects and on which noxious micro-organisms develop.

Preventive measures based chiefly on cleanliness are essential in checking pest infestation. Infestation may also be checked by mechanical means (turning of the grain).

Methods for the disinfection of cereals

As regards control methods, the most effective up to the present are those based on the use of chemical products in liquid, solid or gaseous form.

The liquid preparations used as sprays act as contact poisons and are particularly useful for the disinfection of warehouses and granaries before storing the grain. Preparations made with mineral oils give the best results. To be effective the liquid must entirely cover the insect; this is rather difficult as most of the insects are hidden under the grain, consequently, this method is not efficacious in practice.

Gaseous preparations are effective only if the premises to be disinfected can be hermetically closed. Carbon disulphide has long been in use as a disinfectant; poured on empty sacks placed on top of the sacks filled with grain the CS_2 evolves a heavy vapour which penetrates down through the sacks of grain and spreads over the floor. Disinfection may be continued for 24 hours without damaging the germinative faculty, which is only affected if the operation is continued for over 36 hours. A serious disadvantage of carbon disulphide is its inflammability and the danger of explosion.

In France and the U. S. A., preference is given to chloropicrin. It is not inflammable and has a very toxic action on respiratory action. This treatment checks the germinative power of the grain but does not affect the baking quality of the flour.

As regards other chemical products, ethylene chloride affects the germinative power of the grain. Ethylene oxide mixed with car-

bon dioxide (1 to 3 by volume as in 'Cartox') does not appear to have any effect on the germinative power. Ethylene chloride mixed with carbon tetrachloride (3 to 1 by volume) gives good results.

Ethylene trichloride can also be mixed with other liquids to produce non-inflammable gases, as for example, 'Vesfume' widely used in America.

Hydrocyanic acid is also used for disinfecting warehouses and grain mills; it is not inflammable, is very penetrating and kills all parasites at any stage of development. Neither the germinative power nor the baking quality of the grain is affected. HCN is expensive, but its action is effective and lasting.

Among solid chemical products, mention may be made of the system of dusting grain with desert sand in the control of *Calandra granaria*, used in Morocco and Algeria (preservative action due to the silicic acid in the sand).

The majority of these chemical products have serious defects in that they damage the grain to a certain extent, also the flour, affect panification, and are harmful to man and animals in some way (toxicity, inflammability, etc.).

To avoid these disadvantages, physical methods of disinfection have to be used.

Methods for the combined disinfection and dessiccation of cereals

The physical methods used to disinfect and dry cereals may be based on (a) the use of a vacuum; (b) the use of low or high temperatures (cold, warm gases, steam, etc); (c) the action of short and ultra-short waves; (d) the action of solar, ultra-violet or infra-red rays.

Vacuum. — According to some investigators, vacuum is the ideal method of destroying grain parasites. Formerly, it was the practice to adopt a relative vacuum in conjunction with chemical measures. In this system, the relative vacuum facilitates the contact action and effect of the chemical.

Later, a high vacuum was adopted, rarely employed alone but nearly always with other physical methods (warm gases, rays, etc.). BORASIO, STAMPA and DE REGE have recently carried out experiments on the use of high vacuum alone. This method has many advantages such as complete destruction of insects, larvae, eggs, parasites and partial drying of the grain which makes the caryopsis more compact, less easily attacked by insects and parasites and protects it from mould without affecting the germinative power or the physico-chemical, biological complex of the caryopsis. These experiments have shown that the duration of the treatment varies according to whether it is a question of isolated insects or infested grain, and that the lower the pressure in the receptacle the more rapid the destruction of the insects. It was also seen that the corn weevil when placed in a receptacle where the pressure is lower than 15 mm. of Hg. is destroyed within 40 hours; when using infested grain, the pressure in the vessel was never below 35 mm., consequently destruction took longer, never less than 75 hours. Thus the disinfection of large quantities of grain by this system raises serious problems from the practical aspect (type of installation and suction pumps).

Low and high temperatures

The use of low temperatures and more particularly of high temperatures for the desiccation and disinfection of cereals has been studied in many countries.

Low temperatures

It has been found that the use of cold for desiccation presents difficulties in practice.

Prof. HOFFMANN has determined the ideal state of dried grain by means of low temperature; he says that grain chilled to 14°C . and not containing more than 12 per cent. moisture, is in equilibrium with the surrounding air at 14°C . and with a relative humidity of 50 per cent. Under these conditions there is no longer any moisture exchange grain-air or air-grain. The ideal cold-air drier should operate in such a way that on egress, the grain and air are brought from their initial temperature to 14°C . and 12 per cent. moisture content for the first, and to 14°C . and 50 per cent. moisture saturation power for the second. The vapour tension in the grain and air is then identical and équivallent to 6 mm. of Hg. The condensation point of this vapour tension stands at 3.7°C ., minimum temperature at which it is necessary to cool the air employed to chill and dry the grain.

STEFELD who studied the question from the practical aspect, following on HOFFMANN, found that the chilling and desiccation of 1 kg. of grain at 25°C . containing 20 per cent. moisture to 14°C . and 12 per cent. moisture required 52.72 calories.

Moisture saturated air at 0°C . contains 4.88 gm. of water vapour per cubic metre. Air at 20°C . with a relative moisture content of 60 per cent. contains 10.3 gm. of water vapour. The difference between the two figures, 10.3 and 4.88, 5.42 gm., represents the quality of water that a cubic metre of chilled air can remove from the grain under the conditions indicated. For the 1 kg. of grain mentioned above, therefore, 14.7 m^3 of air are necessary.

STEFELD advocates the combined use of heat and cold, *i. e.*, removal of some of the moisture by heat before the use of cold. The use of cold is of undoubted value in the conservation of cereals, even though its cost is too high to utilize it for drying.

In countries where the winter is severe, positive results can be obtained by freezing. In Sweden, for example, grain parasites are completely destroyed if the grain is stored in wooden silos.

Most grain pests find ideal conditions between 12 and 30°C . Flour weevils, for example, are only destroyed at 15°C . below zero, and their eggs can withstand a temperature of -4 to -5°C . for several days. On the other hand, grain parasites are not so resistant to high temperatures. A temperature of 52 to 60°C . destroys most parasites in a few hours. Experiments have shown that insect eggs are destroyed in 2, 3 and 5 minutes at a temperature between 68 and 75°C ., but that a temperature of 62°C . maintained for 1, 2 and 3 minutes does not completely destroy them (WANJAJEFF). It can be definitely stated, therefore, that a low or high temperature is important in checking the development of grain pests.

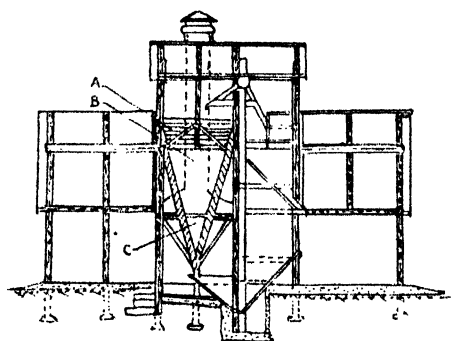
TABLE I. — Data on different types of driers.

| CHARACTERISTICS | Units | SHUTTER DRIERS | | | | | | | | | | CASCADE DRIERS | | | | PNEUMATIQUE DRIER |
|---|-----------|----------------|----------------------|------------------------|-------------------------------|---|---|------------|------------------------|------------------------|--------------------------|--------------------------|---------------------------|------------------|------------|-------------------|
| | | normal draught | | | | | forced draught (ventilator) | | | | | | | | | |
| | | Sievers KZS-2 | L. O. O. S. M. KZS-3 | Flag Kolkhoza No. 1202 | Skoraja (high speed) No. 1230 | Gallinski No. 1224 with discharge apparatus | Gallinski No. 1224 discontinuous method | V. I. M.-2 | Flag Kolkhoza No. 1202 | Flag Kolkhoza No. 1202 | Krassny Vitamin No. 1203 | Krassny Vitamin No. 1203 | V. I. S. Kh. O. M. ZS-2-P | Osvatov No. 1223 | Label type | |
| Temperature of drier | ° C. | 88 | — | 102 | 95 | 80 | 80 | 70 | 100 | 98 | 100.60 | 120-110 | 97 | 100 | 145 | |
| Duration of treatment | minutes | 120 | 120 | 60 | 4.5 | 40 | 40 | 35 | 30 | 45 | 40 | 37 | 105 | 60 | 6 | |
| Temperature of grain: | | | | | | | | | | | | | | | | |
| (a) average | ° C. | 38 | — | 47 | 60 | 51 | 59 | 40 | 62 | 50 | — | — | 41 | 66 | 57 | |
| (b) maximum | ° C. | 44 | — | 73 | 85 | 57 | — | 58 | 90 | 78 | — | — | — | 77 | — | |
| Initial humidity of grain | % | 20.4 | — | 20.3 | 19.2 | 23.9 | 21.2 | 20 | 20.0 | 19.6 | 21.5 | 21.5 | 20.5 | 20.0 | 20.2 | |
| Final humidity of grain | % | 16.2 | — | 15.9 | 12.6 | 13.6 | 15.5 | 16.1 | 13.8 | 14.2 | 19.6 | 19.3 | 16.7 | 16.4 | 18.1 | |
| Moisture evaporated from grain | % | 4.2 | 5.2 | 4.4 | 6.6 | 10.3 | 5.7 | 3.9 | 6.2 | 5.4 | 1.9 | 2.2 | 3.8 | 3.6 | 2.1 | |
| Germinative power before drying | % | 58.5 | — | 94 | 96 | 45 | 55 | 96 | 97 | 72 | — | 40 | 86 | 70 | 42 | |
| Germinative power after drying | % | 53.5 | — | 94 | 95 | 32 | 47 | 95 | 54 | 36 | — | 37 | 81 | 47 | 40 | |
| Load of drier in fresh grain | kg./hour | 707 | 475 | 170 | 520 | 1,040 | 1,100 | 2,178 | 460 | 305 | 1,091 | 986 | 1,153 | 512 | 929 | |
| Capacity of drier in desiccated grain | kg./hour | 681 | — | 161 | 491 | 916 | 1,028 | 2,077 | 427 | 286 | 1,066 | 960 | 1,100 | 490 | 905.3 | |
| Outturn (productive capacity) | qls./hour | 2.97 | 2.47 | 0.75 | 3.43 | 10.7 | 6.3 | 8.50 | 2.65 | 1.65 | 1.08 | 2.1 | 4.4 | 2.36 | 1.94 | |

High temperatures

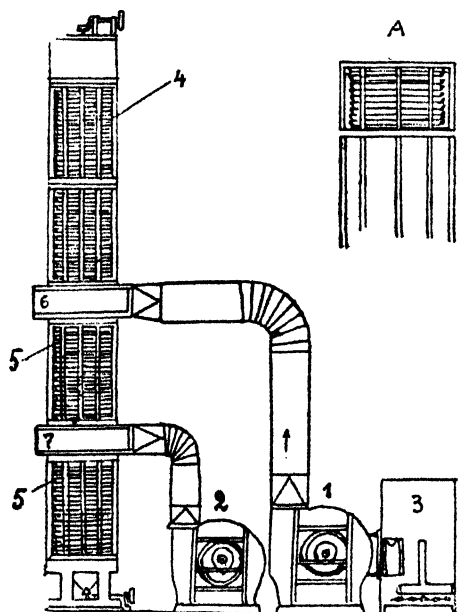
The use of heat, that is of high temperatures, therefore, is an ideal method of disinfection. It would also appear, *a priori*, to be an ideal and economic method of simultaneously drying and disinfecting cereals, if the temperature required for effective disinfection were not too high and thus damaging the quality

FIG. 1. — GALINSKI desiccator
(shutter type).



- A = Feed hopper.
- B = Drying chamber.
- C = Refrigeration chamber.

FIG. 2. — Working of a shutter desiccator (EUREKA).



- (1) Hot air.
- (2) Cold air.
- (3) Heating chamber.
- (4) Drier.
- (5) Cooling.
- (6) Shaft for distributing hot air.
- (7) Shaft for distributing cold air.
- (8) Detail of shutter.

of the grain, or if the degree of temperature sufficient for drying would also be sufficient to destroy all grain pests at any stage of development.

Drying grain by means of air heated to 70°C. or over causes complete destruction of all insects and also prevents the development of moulds and pathogenic micro-organisms. This method, however, has its disadvantages; heating the grain to 70°C. has a harmful effect on the proteins, gluten, glucides and consequently on the biological properties and baking value of the grain.

The system based on the use of heat (air, gases) is perhaps that mostly widely employed in the world and it is necessary to know both its technical and practical aspects in order to compare it with the more modern methods developed.

Effective drying consists of two phases: (1) transudation of the grain in a heated atmosphere when the moisture exudes from the interior to the exterior of the grain; (2) removal of the exuded moisture by means of heated, dry air.

FIG. 3. — *Cascade type of drier.*

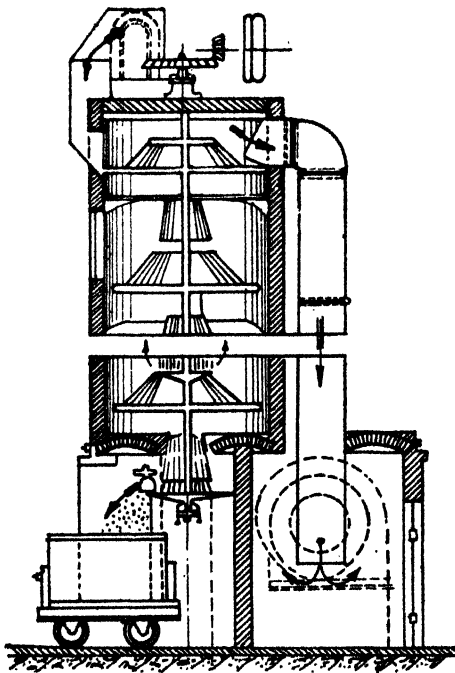
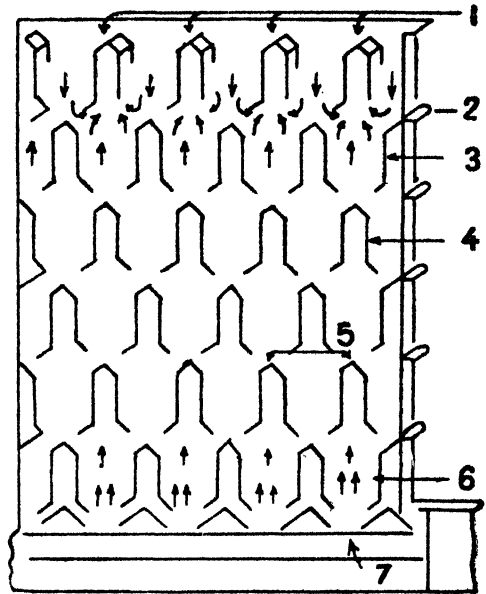


FIG. 4. — *RANDOLF drier (cascade).*



- (1) Top of grain-distributing tubes.
- (2) Immovable joints of side walls.
- (3) Sides of pipes.
- (4) Suction pipes.
- (5) Compression pipes.
- (6) Compression pipes.
- (7) Regulating of grain fall.

It is of interest to follow the changes which take place with the methods usually employed.

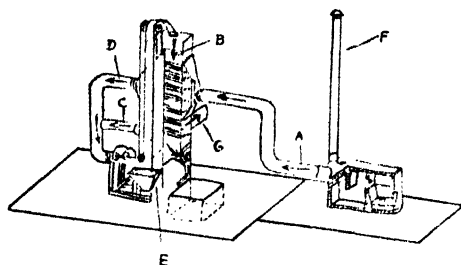
After heating is started, the exchange of heat between the gas and the pericarp of the grain begins. When the pericarp has received a sufficient quantity of energy by conduction, the transmission of energy from the periphery to the centre of the grain takes place by means of thermal conductivity.

The thermal energy, before reaching the endosperm has to traverse the cellular layers (internal and external) of the pericarp. The heat then traverses

the perisperm and the aleuronic layer and only after this stage does the endosperm mass begin to attain the necessary temperature.

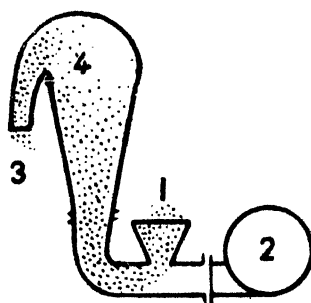
As the pericarp represents the insulating layer, heat penetrates relatively slowly and takes considerable time. Consequently, even at a fairly low temperature (40°C.) important chemico-biological changes occur; these affect the vitamins, gluten, enzymes, glucides and other constituents of the grain.

FIG. 5. — *Plan of V. I. S. Kh. O. M. drier.*



- A — Course of heated gas.
- B — Direction followed by grain.
- C — Cold air after treatment.
- D — Hot air after treatment.
- E — Feed hopper.
- F — Flue.
- G — Gas outlet.

FIG. 6. — *LEBEDEV drier (pneumatique).*



- (1) Feed hopper.
- (2) Air shaft.
- (3) Egress for dried grain.
- (4) Drying chamber.

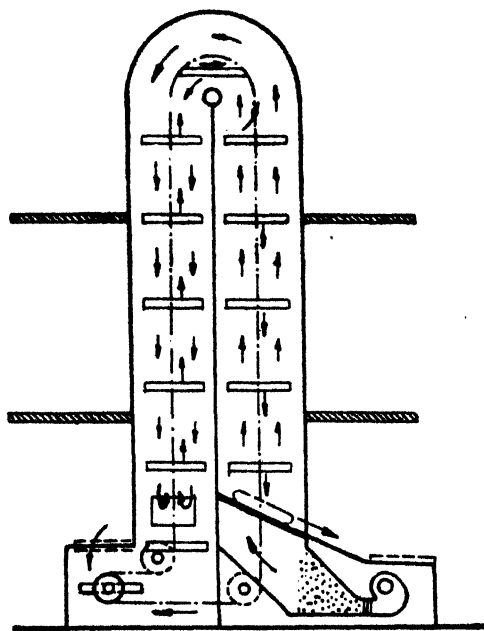
Reducing the duration of exposure to heat by raising the temperature has the same effect. A high temperature (100°C. and over) causes excessive heating of the peripheral layers towards the centre of the grain. As the embryo lies close under the pericarp it is immediately affected by this high temperature, while the central part of the endosperm is not heated enough to evaporate the moisture contained, at the same time losing its biological and baking properties. This is the reason for the decrease in germinative power and the inherent qualities of the flour after drying with warm gases. And as the parenchymatous cells which contain the gluten are placed on the aleuronic layer, this layer, before the central part, attains a temperature which destroys the proteinic substance of the gluten, thus depreciating the baking value. Consequently, to preserve the biological and baking properties of wheat, the gas driers should only heat the grain up to 45-50°C and in the case of seed grain up to 40°C. If the temperature is kept so low, however, complete destruction of the insects is not possible, especially if the grain is infested with different species of mites.

Another disadvantage is the manner in which the moisture in the grain is diffused during treatment with warm gases; this diffusion is checked because evaporation takes place chiefly on the free surface of the grain. Therefore the surface of the grain is dried to a much greater extent than the lower layers, some-

times resulting in the formation of a hard external layer which prevents evaporation of the moisture in the central part, causing the grain to split. This splitting occurs very frequently in paddy.

Although widely used, the various systems of drying and disinfecting grain by means of heated air have their disadvantages.

FIG. 7. — *Endless chain type of drier.*



Apart from the inherent defects of this system, the more or less successful result of treatment by means of warm gases also depends on the type of apparatus employed.

In disinfecting cereals by means of ordinary sources of heat (warm gases, etc.), it is necessary to stir the grain continuously, as the amount of heat employed is not sufficient to disinfect masses of grain in heaps or sacks. For this purpose, there are different apparatus or systems to keep the grain moving so that the heat is distributed as evenly as possible. With some types, the movement of the grain is horizontal, with others vertical, and with others again, movement is on an inclined plane. In some drying chambers, the admission of the heated air is regulated by means of a valve, and if the draught is insufficient, ventilation is increased.

In the driers where the grain is

shifted by means of carrier bands, the warm air follows the course of the grain, either in the same or preferably in the opposite direction.

Among the best known desiccators, mention may be made of the Galinski and Eureka shutter driers (fig. 1 and 2) which besides the heating chamber comprise a cooling chamber; the former is the most widely used in Russia; the Randolf cascade drier, the V. I. S. Kh. O. M. and others (fig. 3, 4 and 5) in which the grain to be desiccated is raised to the top of a cylindrical tank, from where it slowly descends through the very small openings in the top platform coming in contact with the heated air rising up the tank. In this case, the more humid grain encounters the moistest air, and the drier the grain the drier the air encountered. The Lebedev pneumatic drier (fig. 6) comprises a chamber in the form of an inversed cone into which the heated air is introduced together with the grain. Owing to the increased transversal section of the chamber, the grain attains an equilibrium at a certain height and remains suspended in the drier by the mobile heated air. The caryopsis gradually diminishes in weight and is thrown out of the apparatus by the current of warm air. The endless chain drier (fig. 7) is composed

of a vertical chamber in which the fresh grain is placed on a canvas attached to an endless chain. This vertical chamber can be divided in the interior into several superposed layers. In the band drier, the grain is moved in a horizontal and in a vertical direction. Each belt is stretched on and worked by two rollers. The grain falls onto the end of the first belt and after having moved along its entire length, drops onto the second belt and so on until its egress. The air circulates from the bottom upwards or else laterally. The rotary or drum desiccator consists of a cylinder with an inclined axis mounted on rollers. The grain introduced into the upper part of the cylinder, advances as a result of the rotary movement and inclined axis. When this drier is not tilted, driving boards push the grain towards the extremity of the cylinder. This type of drier may consist of one or more cylinders.

The different types of driers have been studied by BELOPOLSKY who in a synoptic table gives the chief data on shutter driers (with normal or forced draught), cascade driers and the pneumatic drier of Lebedev. In Table I are indicated the drying temperatures of the different apparatuses, duration of the treatment, the mean and maximum drying temperature of grain, initial and final moisture content, germinative power before and after treatment, the load of a drier in fresh and dry grain, yield per hour, etc.

(To be continued).

E. GASSER and G. STAMPA

MISCELLANEOUS INFORMATION

***Lonicera edulis* as a fruit crop**

Species of honeysuckle very widespread in Eastern Siberia, chiefly in the basin of the Amour and in the Russian maritime province of the Far East.

Lonicera edulis comes under the Section *Chamaecerasus* and is not a climbing plant. The shrub attains a height of 1.50 to 2 metres and has elliptical leaves, strongly pubescent. The plant is very hardy and suffers no damage even in the severest winter. Early flowering is not affected by spring frosts. Soil requirements are very few, though moist soils are preferred; the plant also grows well even in very moist soil and under shade. The cool and moist regions of France and Europe are eminently suited to this plant. Mme T. MAURITZ (Nertchinsk-Transbaikalia) introduced the cultivation of *Lonicera edulis*, now very widespread in eastern Siberia, together with other wild Siberian species: *Ribes dikuscha* Fisch., *R. procumbens* Rall., *R. diacantha* Pall., *Armeniaca sibirica* Lam., *Vitis amurensis* Rupr., etc.

The fruit is blue, pruinose, cylindrical or elongated oval, about 2 cm. long and 1.25 cm. across, and has a peculiar very pleasing taste, sourish-sweet and piquant.

The plant matures early (end of May, beginning of June in Siberia) and is very productive. A market can easily be found for the fruits, either bottled or in jams or in the form of wines, brandies.

In Europe, probably, the fruits would mature earlier (in the first fortnight in May).

There are already several varieties in cultivation; some are seedless. Cultivation is very simple: by seed, cuttings or layering. (See also: *Revue Horticole*, Paris, No. 2070, April, 1940).

G. S.

Experiments on the fattening of late-season lambs on summer artificial meadows

In the *Revue* of the Faculty of Agronomy (Montevideo, January, 1940, pp. 131-181), A. COSTA, agricultural engineer, gives an interesting report on the experiments carried out under the auspices of the National Commission for the study of the forage problem in Uruguay, on the fattening of late-season lambs on summer artificial meadows.

After a brief review of the characteristics of the production of the different lamb types of the country, the writer discusses in detail the forages tested. The grasses cultivated were Sudan grass and Rhodes grass (*Chloris gayana*). The author determines the origin of these plants, their botanical characteristics, conditions of transient toxicity in Sudan grass, soil requirements, cultivation methods, sowing, arrangement of pasturage and number of animals per hectare, as well as their composition at different stages of growth.

The experiments on these two summer forage plants were carried out during 1936-1937 and 1937-38. A statistical and economic study of the results obtained follows the description of these experiments.

The following conclusions may be drawn:

(1) despite the unfavourable conditions under which the experiments on establishing the artificial meadows were carried out in the two years, the Sudan grass pasturage gave very satisfactory results, both in maintaining and fattening the late-season lambs;

(2) to the stock-farmer, Sudan grass is of capital importance as a reserve feed during summer months' shortage.

(3) the protective action of the pasture against intestinal infection prevents sheep losses;

(4) Sudan grass is not toxic to sheep;

(5) Rhodes grass does not give good results, probably due to the way in which the sheep graze, which not only checks propagation of this forage, but may even cause the plants to die back.

A. P.

BOOK NOTICES *

Enciclopedia delle piccole e medie industrie, compiled under the direction of Signor CIANCIMINO, enlarged edition, revised and illustrated. Volume I: Industrie agricole. Milan, Ufficio Propaganda Edizioni Milanese, 1939, 398 pp., Lire 40.

[The first edition of this work, published under the title of *Manuale delle Piccole Industrie* in a smaller format than the present edition, has been considerably enlarged, revised and brought up to date. The first volume of this encyclopedia on agricultural industries will increase the industrial and commercial knowledge of the reader and will be found most useful in the practical application of the subject chosen by the farmer. Among the agricultural industries treated in this important encyclopedia are apiculture; breeding of poultry and other small livestock, rabbits for meat, for fur; canning (rabbit meat). Information is given on stock-raising—cattle, goats and pigs, with special details on the Karakul sheep; butter- and cheese-making. Among the crops which are to be increased in area, mention may be made of mushrooms, truffles, asparagus, sugar-beets, carnations, herbaceous oil-yielding plants, establishment of olive nurseries, cultivation of medicinal plants, cultivation and production of conifers. Useful information is also given on silk-worm breeding, carp, oyster and mussel raising. Other chapters deal with the conservation and drying of fruits, the preparation of fruit syrups and jams, tomato sauces and ketchups, and the artificial aging of wines.

The clear and concise manner in which this encyclopedia has been drawn up makes it easily comprehensible to all classes of farmers and will prove a constant source of information and advice].

E. G.

KIEFERLE, F. and UMBRECHT, I., *Schmelzkäseindustrie*. Kempten (Allgäu) Verlag: Deutsche Molkerei Zeitung, 1939, 211 pp., 26 illustrations.

[This work on the processed cheese industry is, to a certain extent, an elaboration of the brochure 'Schmelzkäse' of O. METZGER and Dr. I. UMBRECHT, published some ten years ago by the 'Deutsche Molkerei Zeitung', Kempten (Allgäu). This new edition comprises three parts: the first (UMBRECHT), general information; the second (KIEFERLE), particularly interesting, deals with the technology of the processed cheese industry and the third (UMBRECHT), the analysis and the valuation of processed cheeses.

Of especial importance in the second part are the chapters on the blending of cheeses at a fixed fat content, preparatory treatment of the products used, solvents and their use (in particular, the new methods of blending with salts of high molecular weight of phosphoric acid), apparatus, cheese blending.

The subject treated in the third part, that is, the valuation and analysis of processed cheeses, is more important than ever to-day, the new industry of processed cheeses has made remarkable progress in the last years and numerous products have been launched on both home and foreign markets. The question of the relative value of processed cheese in comparison with natural cheese, which is often treated arbitrarily by experts, is discussed clearly and in detail.

The different aspects of the processed cheese industry are examined in a comprehensible and concise manner and the many illustrations add to the value of this important work].

E. G.

* Reviews of books presented to the Library appear under this heading.

Deutsche Forschungsstätten im Dienste der Nahrungsfreiheit. Ein Handbuch im Auftrage der Forschungsdienstes bearbeitet von Dipl. Landwirt Hanns PIEGLER. Neudamm, J. Neumann, 1940. 486 pp.. RM. 26.

Up to the present, information on agricultural research institutions in Germany could only be obtained from small concise lists such as Mentzel-Lengerke's Agricultural Calendar or from general reference books like the 'Minerva'. The volume under review takes the form of a directory in which the detailed and complete information on the different experiment and research stations in Germany is excellently arranged. A particular advantage of this book is that all branches of agriculture are included, not only agricultural research proper, but also allied and auxiliary subjects such as natural science, agrarian history, general economics, regional planning, veterinary science and the industrialization of agricultural products. The institutions listed total 1249 and cover not only the former Reich but also Ostmark and Sudetenland. Besides the full address, a fairly detailed description is given of each organization together with further bibliographical references, on the scope and activities of each, thus providing the reader with a reliable and accurate source of information. A list of the persons cited and a place index are appended.

This excellent directory was compiled by the 'Forschungsdienst', which for the last five years has been in charge (authorized by Ministerial Decrees) of the centralization, promotion and organization of agricultural research in Germany. The book opens with an introductory by the Chairman of the Forschungsdienst, Prof. Konrad Meyer.

S. v. F.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

MONTHLY BULLETIN

OF

AGRICULTURAL SCIENCE AND PRACTICE

SORGO *

(continued)

Sorgo for syrup production in the United States.

Sorgo or sugar sorghum is cultivated in the United States for syrup production in about 40 States which differ considerably in climate. The sorgo belt extends from Virginia, West Virginia, North Carolina, South Carolina and North Georgia across Kentucky, Tennessee, Missouri, Arkansas and Oklahoma, including also the northern regions of Alabama, Mississippi and Louisiana. On most farms, sorgo is considered of secondary importance, less than an acre per farm being cultivated with this crop. The syrup is made on the farm by means of rather rudimentary apparatus or sometimes in sorgo cane mills now fairly important. It is chiefly intended for home use, only any eventual excess being sold. It is only when sorgo is cultivated for purely commercial purposes—infrequent—that the farmers sow larger areas; the extent of the crop is arranged by contract with the factories.

Sorgo syrup production varies as seen from the following figures given by the Bureau of Statistics and the Ministry of Agriculture:

| | | | |
|----------------|-------------------|----------------|--------------------|
| 1859 | 6,749,123 gallons | 1909 | 16,532,382 gallons |
| 1869 | 16,050,089 " | 1919 | 30,950,000 " |
| 1879 | 28,444,202 " | 1929 | 9,380,000 " |
| 1889 | 24,235,219 " | 1937 | 11,915,000 " |
| 1899 | 16,972,783 " | 1938 | 11,467,000 " |

The figures cited are only approximate, no account being taken, probably, of the amount made on a small scale.

The following table shows the variation in the extent of cultivation and syrup produced in recent years.

The cultivation of sorgo for syrup has declined rapidly since 1920. The slight increase in the years 1930-1933 was followed by a decrease. In the majority of the territories this crop was replaced by sugar cane. From 1931 to 1938, the production of sugar cane syrup increased from 15.2 to 22.2 million gallons, while that of sorgo dropped from 17.9 to 11.46 million gallons. The reason for this change is simple. In 1938 while sorgo yielded an average of 60.4 gallons of syrup per acre, sugar cane produced 172.2.

* See this *Bulletin*, 1940, No. 10, p. 331, No. 11, p. 382.

TABLE I. — *Sorgo syrup production in the United States.*

| Year | Area cultivated (in thousand acres) | Syrup produced (in thousand gallons) |
|----------------|--|---|
| 1920 | 457 | 32,895 |
| 1925 | 200 | 10,706 |
| 1931 | 264 | 17,888 |
| 1932 | 257 | 15,512 |
| 1933 | 257 | 15,870 |
| 1934 | 241 | 14,525 |
| 1935 | 231 | 13,350 |
| 1936 | 215 | 11,893 |
| 1937 | 193 | 11,915 |
| 1938 | 190 | 11,467 |

TABLE II. — *Acreage of sorgo in the different States.*

| State | Area cultivated (in thousand acres) | | Average production (gallons per acre) | | Total production (in thousand gallons) | |
|------------------------------|--|------|--|------|---|--------|
| | 1938 | 1937 | 1938 | 1937 | 1938 | 1937 |
| Alabama | 33 | 28 | 67 | 70 | 2,211 | 1,960 |
| Texas | 33 | 33 | 50 | 52 | 1,650 | 1,716 |
| Mississippi | 18 | 18 | 70 | 71 | 1,260 | 1,322 |
| Arkansas | 20 | 22 | 47 | 58 | 940 | 1,276 |
| North Carolina | 14 | 16 | 70 | 70 | 980 | 1,120 |
| Georgia | 16 | 14 | 61 | 66 | 976 | 924 |
| Tennessee | 15 | 16 | 58 | 57 | 870 | 912 |
| Kentucky | 11 | 13 | 63 | 60 | 693 | 780 |
| Missouri | 10 | 12 | 58 | 46 | 580 | 552 |
| Virginia | 2 | 3 | 75 | 70 | 150 | 210 |
| Indiana | 3 | 3 | 63 | 65 | 189 | 195 |
| Illinois | 2 | 2 | 66 | 74 | 132 | 148 |
| Other States | 13 | 13 | 62 | 61 | 836 | 790 |
| Total and averages | 190 | 193 | 60.4 | 61.7 | 11,467 | 11,915 |

Sorgo in Italy.

In recent years, chiefly since 1935-36, much attention has been given to sorgo in Italy. It is an exaggeration to speak at the moment of extensive cultivation, but considerable research work and experiments on a large scale have been carried out in all parts of the country, taking into consideration the different factors which may affect yield, with a view to preparing the way for extensive cultivation, at the same time limiting, as far as possible, the losses which are inevitable in adapting crops to new conditions.

The main object of cultivating sorgo in Italy is for the production of fuel alcohol. In addition, the utilization of the bagasse for cellulose manufacture is being considered. Twelve quintals of cellulose could be obtained from 350

quintals of cane after extraction of the juice. It is calculated that one hectare of sorgo would yield an average of 18 to 20 quintals of grain and 300-400 quintals of stripped cane.

Little information is available on the acreage under sorgo in the last few years and on the results obtained. In 1937, there appear to have been 259 hectares cultivated in the provinces of Padua, Venice and Vicenza. In 1938, 875 hectares were sown, but owing to unfavourable climatic conditions and insect attack, only 260 ha. remained.

In 1939, cultivation was to be increased to 3000 ha. It is not known, however, if this plan was carried out. According to the information published in the daily press, 245 ha. were sown in the Agro Pontino, but owing to unfavourable conditions, acreage was reduced to 185 ha., with a total yield of 13,357 quintals of cane and 224 qls. of grain, that is an average yield of 72 qls. cane and 1.21 qls. of grain per hectare. Some farms, however, obtained 340 qls. of cane and 18 qls. of grain per hectare. It is reported that in the Agro Romano 350 ha. were sown with sorgo, the yield amounting to 250 qls. per ha. in dry areas and 400 qls. in irrigated land. The price paid at the mill was 10 lire per quintal of stripped cane. The grain is worth 60 lire per 100 kg.

No statistical data are available on the area under sorgo cultivation in 1940. At Maccarese 250 ha. were cultivated mostly with irrigation; the average yield amounted to 200 qls. cane and 20 qls. grain per ha. In the Agro Pontino, Agro Romano and the Azienda dell'Isola Sacra, 1050 ha. were grown, the average yield per hectare being 148-150 qls. cane and 15-18 qls. grain. In the Agro Pontino, the yield in cane, on an average, came to 100 qls., while at Isola Sacra, with better soil and irrigated cultivation, yield amounted to 330-340 qls. The price paid to farmers in 1940 is 12.50 lire per quintal of cane.

Cultivation of sorgo.

Sorgo is only cultivated extensively in the United States, therefore the methods followed in this country will be described, at the same time indicating the different conclusions attained in Italy.

In the United States the aim followed in sorgo cultivation is not a high grain yield nor maximum cane production, but the highest possible yield in good quality syrup. This depends on the yield in cane, the proportion of juice which can be extracted and the sugar content of the juice. Certain secondary factors influence yield, price of the crop and quality of the product; in particular, uniformity in the growth and maturity of the cane or stalks, verticality and size of stalks, their conservation faculty after maturity, absence of impurities which may enter into the juice and depreciate the quality of the syrup.

Careful selection of varieties, suitable tillage and the use of fertilizers have an appreciable influence on yield in weight. Late varieties generally produce more stalks and the weight of these is maximum when the plants attain their maximum development and the medullar parenchyma contains the most juice.

Choice of land. — Sorgo grows well on practically all arable land, but the best results are always obtained on fertile soils with a good physical structure. Light deep soils containing a certain amount of lime are very suitable.

On poor soil, the stand is less dense, growth is slow and the stalks do not attain sufficient height or thickness. The soil should be well drained, free from stagnant water and easily retain warmth. Good wheat soils, alluvium and sandy alluviums are more suitable than clayey soils often not so well drained, colder and apt to form a surface crust.

Although sorgo is very resistant to drought, good cane yields can only be obtained if the soil has a sufficient moisture content or, in arid regions, on irrigated land.

Place of sorgo in rotation. — As sorgo is cultivated over a wide area, it is naturally included in different rotations. In many south-eastern States of the U. S. A., as well as in Arkansas and part of Louisiana, Oklahoma and Texas, the chief crop is cotton. In these regions sorgo can be introduced in different rotations which include cotton, for example:

1st year: cotton;

2nd year: sorgo, with or without cowpeas (*Vigna catjang*) planted between the rows at the time of final cultivation operations;

3rd year: winter wheat or oats followed by cowpeas as a catch crop.

Clean cultivation is the usual system employed in cotton-growing. This is a good preliminary; sorgo is often followed by a winter crop, black medick, crimson clover, sand vetch or barley being recommended.

In the Northern States, sorgo can be substituted for maize in rotations. The following three rotation schemes are advocated by J. J. WILLAMAN, R. M. WEST and C. P. BULL for Minnesota:

| 5 years | 3 years | 4 years |
|-----------------|-----------------|-----------------------------|
| Maize and sorgo | Sorgo | Maize |
| Cereal | Cereal | Sorgo (fertilizer required) |
| Cereal | Forage (clover) | Cereal |
| Forage | | Forage |
| Forage | | |

Sorgo has an adverse effect on the succeeding crop and leaves the soil in poor physical condition. Although this effect is only temporary it should not be forgotten, and whenever possible sorgo should be followed by a hardy plant having few soil requirements. After sorgo harvested in October-November, oats sown in March or April can be successfully cultivated; cowpeas grown after oats as above or else sown in May; Mauritius black bean or soybean sown in May or June.

Soil preparation. — Sorgo requires clean soil, deeply tilled, well broken-up, without holes or lumps. Deep ploughing is advocated, care being taken at the same time to avoid bringing the sterile sub-soil to the surface. Ploughing should be preferably carried out in autumn or winter. This system has the advantage of destroying all useless vegetation and facilitating the absorption of winter moisture. The object of subsequent cultivation operations is to check weed growth, break up the surface layer by crumbling all clods of earth, and keep the soil well turned to maintain capillary action.

In poorly drained soils, the surface excess water which would destroy the seeds must be removed by means of run-off ditches. In some cases the soil is ridge-ploughed and the seeds placed on top of the ridges formed. A slight furrow traced on top of the ridge remains moist longer owing to the water it can retain while the excess water is removed by the deep furrows which border the ridges. This system tends to produce a more regular and homogeneous crop, but has the disadvantage of increasing cultivation costs and the adverse effects of drought.

Fertilizers. — It is well known that sorgo removes large quantities of nutrient elements from the soil. If a heavy crop is desired, sorgo has to be cultivated on fertile soil with, in addition, the application of fertilizers. The plant benefits considerably from manure or chemical fertilizers. Manuring helps to produce a denser stand and assists the young plants through the first weeks—always critical—of growth. Towards the northern limit of sorgo cultivation, some growers are against the use of manure which prolongs vegetation to the detriment of maturity, the favourable season being very short. H. B. COGWELL reports that on alluvial and clayey soils good results were obtained by applying per acre 300 lb. of compound fertilizer containing 7.5 per cent. ammonia (6.18 per cent. nitrogen) and 7.5 per cent. phosphoric acid. According to A. H. BRYAN, some farmers frequently use wood ash.

In Italy, the following method is advocated: 60,000 to 70,000 kg. per hectare of good manure with deep ploughing, finishing off with an application of 600 to 800 kg. of superphosphate and 200 kg. of sulphate of ammonia or cyanamid; 100 kg. of calcium nitrate or ammonium nitrate are also spread over the surface.

In general, potash is not given. The experiments of IYENGAR N. C. CHOKKANNA, however, have confirmed the importance of potash for sorgo—as for other sugar yielding plants—in the elaboration of the sugar substances. The use of potassium salts, therefore, can be recommended, particularly if these fertilizers can be obtained at a reasonable price.

Sorgo varieties.

The very wide distribution and the facility for fertile natural crossing of sorgo has resulted in a large number of varieties, many of which differ but slightly or are only local adaptations or denominations. To add to the confusion, most of the varieties are known under different names, which according to region are not always applied to the same variety. J. H. VINALL and his collaborators cite 31 synonyms for the Colman variety, 24 for Honey and 28 for Sapling, etc. The name Silver Drip or Honey Drip is used for Colman, Honey, Orange, Planter, Sapling and Sugar Drip; that of Ribbon Cane for Gooseneck, Honey, Orange, Planter and Sapling, etc. Consequently, there is often some doubt as regards the true identity of the variety.

On the other hand, according to the Italian scientists who are studying the introduction of sorgo into Italy, and in particular to Professor E. PARISI "in the United States, after the failure of the attempts to obtain sugar from sorgo, the plant was left to the farmers.... For this reason, the races degenerated.

The Institutes of Plant Genetics only maintained the botanical purity of the chief sorgo races and did not trouble about their sugar content, and, involuntarily, created "new varieties through an amalgam of strains only physiologically identifiable by chemical analysis". At Milan, for example, samples of the Rex variety obtained from five different sources and cultivated in adjoining plots, could not be differentiated by meticulous examination of either the kernels or the panicles. Chemical analysis, however, revealed average variations of 4° of sugar in plants of different sources and even of 10° in plants of the same morphologically pure origin. Variations would be greater and sometimes disconcerting in commercial varieties, despite the apparent morphological homogeneity. It must be conceded, therefore, that the American varieties are frequently formed of an amalgam of strains similar morphologically, but very variable physiologically.

In 1936, H. N. VINALL, J. C. STEPHENS and J. C. MARTIN, continuing and completing earlier studies, published in a technical Bulletin of the U. S. Department of Agriculture, a key for the identification of the chief sorghum varieties cultivated in the country; the botanical description of each variety is accompanied by a photograph of the panicle and the kernels. Prof. PARISI has also published a brief botanical description with photographs of the principal varieties cultivated in the experiment field of the Institute of Agricultural Industries at Milan. These two sources, supplemented in some cases by the observations of different authors, form the basis of Table III given further on. The information and botanical description of the varieties being necessarily brief, it is advisable eventually to refer to the original description.

Maturity. --- Time of maturity varies widely in different seasons and is also affected by date of planting; early planting usually results in a longer growing season; a very late planting may have the same effect, maturity being retarded by the cool autumn weather. The relative order of maturity of varieties, however, is fairly constant.

H. N. VINALL and his collaborators classify sorghums for maturity as follows:

| | |
|-------------------------------|------------------|
| Very early | 90 days or less |
| Early | 91 to 100 days |
| Early to mid-season | 101 to 108 days |
| Mid-season | 109 to 114 days |
| Mid-season to late | 115 to 120 days |
| Late | 121 to 124 days |
| Very late | 125 or more days |

This classification is based on observations carried out over a considerable period of years. Where the period of observation was insufficient, the varieties in question were compared with standard varieties of known maturity. These averages are subject to considerable environmental fluctuations and in some cases a variety may be as much as 25 days earlier or later than the average period. It is seen that in general, whether due to environmental differences or to date of planting, time of maturity is longer in Italy than in the United States.

Height. — The height of sorghum plants varies with environment and shows some fluctuation under different conditions. The comparative heights are rather consistent, except when a late variety stunted by adverse climatic conditions or other factors cannot attain its normal development. Varieties more than 72 inches in average height are regarded as tall. The measurements indicated in Italy are generally greater than those given by VINALL and his collaborators.

Stem thickness. — Thick-stemmed varieties have a diameter at the lower internode of 1 inch or more, whereas the stem diameter of varieties classed as slender does not exceed five-eighths of an inch. Early varieties usually have slenderer stems than late varieties.

Tillering. — Tillering is to some extent a varietal characteristic. A fertile soil with an abundance of moisture and ample spacing favours the development of tillers. Close planting, on the contrary, checks tillering. Taking the average of six years' experiments on nine varieties of sorgho, J. B. SIEGLINGER and J. H. MARTIN obtained 1.32 tillers per plant when spaced 6.6 inches in rows three and a half feet apart, and 3.20 tillers when the plants were spaced 36.7 inches in the rows.

Branching. — Buds are borne at all the nodes except the upper one which bears the peduncle. The buds generally do not develop into branches until the stem is approaching maturity, and under ordinary conditions not more than one or two branches are produced. The upper bud usually produces the first branch and the succession of branches proceeds down the stalk. In the case of lodging and if there is sufficient moisture, all the buds may develop. Tendency to branching is a varietal characteristic.

Recurving of peduncle. — Of the sorgos, bending of the peduncle is only found in the Gooseneck variety. Recurving is most abundant when the plants are thinly spaced and appears to be due to the insufficient lignification of the peduncle when the panicle is relatively heavy. The peduncle subsequently becomes lignified and thus is permanently recurved.

In the following table, grouped according to maturity, are given the sorgho varieties described by VINALL and his co-workers, varieties approved in the United States, together with a variety indicated by A. ALDOVRANDI and the varieties of which E. PARISI has given a description and photographs of the panicle and kernels. Mention is made in some publications of many other varieties such as Early Orange, Waconia Orange, Adria, Spargolo, Honey Wood, etc. in Italy, but without any description or indication of origin.

Sorgho selection in Italy.

Unless special precautions are taken, pure sorgho races easily degenerate. It is not surprising, therefore, that degeneration has taken place in the varieties introduced into Italy from America and that considerable polymorphism is observed in these plants together with wide variations in the juiciness of the stalks and in the sugar content of the juice.

Genealogical selection is being carried out at the Bottrighe Plant Breeding Centre of the 'Società Anonima Carburante Cartura' and at the Plant Breeding

TABLE III.

| Variety | Origin | Maturity | | |
|----------------------------------|---|--|----------------------|--------------|
| | | According to VINALL, STEPHENS and MARTIN | According to COGWILL | In Italy |
| Dakota Amber | A short early strain of Minnesota Amber (1915). | 87 days (6 crop years) ⁽¹⁾ | — | 125-145 days |
| Red Amber | Possibly derived from a variety known as Shalooova introduced by L. WRAY. Selected from an Early Orange imported from Australia into the United States in 1903. | 96 days (37 years) | — | — |
| Minnesota Amber | Selected from Early Amber by S. H. KENNEY about 1869. | 96 days (20 years) | 85-95 days | — |
| Waconia Amber | Selected from Minnesota Amber (1924). | 96 days | — | — |
| Collier | From South African sorghum called Undendebule imported into the U. S. A. in 1881. Collier is one of the types obtained. | 97 days (7 years) | — | — |
| Chinese Amber | Obtained from seeds imported into France by M. de MONTIGNY in 1851. | 100 days | — | — |
| Leoti | Undetermined | 104 days (10 years) | — | — |
| Early Sumac | Obtained from a farmer and developed by selection at the Fort Hays Station, Kansas. | 107 days (12 years) | — | — |

⁽¹⁾ This figure indicates the number of crop years over which observations were carried out; the number

TABLE III.

| Height | | Description | Observations | Synonyms |
|--|----------|--|---|---|
| According to VINALL, STEPHENS and MARTIN | In Italy | | | |
| 62 inches (6 years) (1) | — | Panicles small, erect, mid-compact to effuse, ellipsoid to fusiform; glumes shiny black; kernels reddish-brown and buff, broadly ovoid or globose; stem mid-slender, tillers freely, branches mid-freely. | — | Early Amber. Black Amber. |
| 71 inches (37 years) | — | Stems mid-stout; tillers freely; branches mid-freely; panicles mid-size to large, erect, effuse, ellipsoid; glumes deep or dark red; kernels light reddish brown, usually ellipsoid. | — | — |
| 72 inches (20 years) | — | Stems medium; tillers freely; branches mid-freely; panicles midsize to large, erect, effuse, conoid to ellipsoid, or with branches often hanging to one side; glumes black or brownish black; kernels partly reddish brown and partly buff, ellipsoid. | Lodges easily under the action of wind (E. PARISI). | Black Amber. Early Amber. Early Black Amber. Minnesota Early Amber |
| — | — | Practically identical with Minnesota Amber . | Appears more resistant to head smut than Minnesota Amber . | — |
| 71 inches (12 years) | — | Stems medium; tillers and branches freely; panicles small, erect, sometimes effuse and unbelliform, but more often not spreading and tending to droop to one side; glumes straw coloured to reddish brown; kernels reddish brown, ellipsoid. | High sugar content; little resistance to wind (E. PARISI). | — |
| 74 inches | — | Stems medium; tillers freely; branches mid-freely; panicles erect, effuse, conoid; glumes black; kernels brown, ellipsoid. | Little resistance to wind (E. PARISI) | Early Amber. |
| 68 inches | — | Stems medium; tillers freely; branches sparsely to mid-freely; panicles erect, mid-compact, tending toward effuse, cylindroid or obconoid; glumes gibbous, yellowish red; kernels buff colour, ellipsoid. | Of little commercial value (E. PARISI). | Leoti Red. |
| 64 inches | — | Stems more slender than Sumac ; branches more freely; other characters are like those of Sumac , only the panicles are smaller. | — | — |

of days, therefore is the average for these crop years.

TABLE III (continued).

| Variety | Origin | Maturity | | |
|---------------------------|---|--|----------------------|----------|
| | | According to VINALL, STEPHENS and MARTIN | According to COGWILL | In Italy |
| Colman | Natural hybrid found in 1887 and developed by A. DENTON at the Sterling Experiment Station, Kansas. | 109 days (12 years) | — | 120 days |
| Folger | Selected from Early Amber | Mid-season | 100-110 days | — |
| Planter | Resembles L. WRAY'S Neeazana . Was grown at the Government Experiment Farm at Sydapet, Madras, India in 1875, then in Australia from where it was imported into the United States in 1888. | Mid-season | — | — |
| Rex | Appear to be selections from natural crosses found in Link Hybrid (Sampling) and Amber at the Sterling Station, Kans. | Mid-season | 110-125 days | 180 days |
| Denton | Selected from Honey sorgo by A. DENTON at the Sterling Experiment Station, Kans. in 1888. | Mid-season | — | — |
| McLean | Variety received by the U. S. Department of Agriculture from P. MCLEAN Under Secretary for Agriculture, Queensland, Australia. | 111 days (11 years) | 110-125 days | — |
| Sterling | Probably arose from one of the varieties introduced by L. WRAY. Discovered in 1888 by E. LINK in a field of Honey sorgo in Tennessee. | Mid-season to late | 110-125 days | — |

TABLE III (continued).

| Height | | Description | Observations | Synonyms |
|--|----------|--|--|---|
| According to VINALL, STEPHENS and MARTIN | In Italy | | | |
| 73 inches | — | Stems mid-stout; tillers freely; branches sparsely; panicles mid-size, erect mid-compact, cylindroid or sometimes ellipsoid; glumes intense dark red; kernels, mostly light buff to reddish brown, ellipsoid to ovoid. | One of the most promising syrup varieties (E. PARISI). | Honey Drip. Sugar Drip. Red Orange. |
| Tall | — | Stems mid-stout; tillers freely; branches mid-freely; panicles erect, mid-compact, cylindroid or tending toward ellipsoid; glumes black or very dark reddish brown; kernels partly light buff and partly reddish brown, ellipsoid to obovoid. | Little resistance to wind; low syrup yield (E. PARISI). | Folger's Early |
| Tall | — | Stems mid-stout; tillers freely; branches mid-freely; panicles erect, mid-compact or tending toward effuse; glumes straw-coloured to light brown or sometimes black; kernels buff to light brown, ellipsoid to globose. | Very hardy, fairly rich in sugar; weight of the stripped cane varies between 600 and 800 g. (E. PARISI). | Planter's Friend |
| Mid-tall | — | Stems mid-slender to mid-stout; tillers freely; branches mid-freely; panicles erect, slender mid-compact, cylindroid or sometimes fusiform; glumes reddish brown, obovoid to sometimes ellipsoid. | There are several strains of varying industrial value. Rex is one of the most productive varieties but matures late (E. PARISI). | Red X. |
| Mid-tall | — | Stems mid-stout; tillers and branches freely; panicles erect sometimes tending toward effuse, cylindroid to fusiform; glumes brownish red; kernels light brown or tan with reddish brown spots, ellipsoid. | Very little resistance to wind; one of the highest sugar-yielding varieties (E. PARISI). | — |
| 72 inches (14 years) | — | Stems mid-stout; tillers freely; branches mid-freely; panicles long, erect, mid-compact tending toward effuse, cylindroid or approaching cylindroid; glumes straw-coloured to reddish brown; kernels reddish brown, ellipsoid to ovoid or obovoid. | Not very hardy, high sugar content (E. PARISI). | — |
| 88 inches (9 years) | — | Stems mid-stout; tillers freely; branches mid-freely; panicles erect, compact, cylindroid; glumes black; kernels reddish brown, ellipsoid. | Tall and hardy plant. Some strains are of industrial value others not at all (E. PARISI). | Saccaline (Australia). Pink hybrid. Straightneck. |

TABLE III (continued).

| Variety | Origin | Maturity | | |
|--|--|--|----------------------|--------------|
| | | According to VINALL, STEPHENS and MARTIN | According to COGWILL | In Italy |
| Sugar Drip | Origin unknown | Mid-season | 110-125 days | 180 days |
| Orange ⁽¹⁾ | Apparently derived from a variety introduced by L. WRAY; possibly a variant with brown seed and darker coloured glumes than the white-seeded Neeazana . | 113 days (10 years) | — | 125-145 days |
| Sourless | Probably a descendant from the Neeazana variety introduced into the U. S. A. by L. WRAY. | 113 days (13 years) | — | 120 days |
| White African | Apparently a descendant from the Enyama variety introduced by L. WRAY. | 118 days (12 years) | 100-125 days | 150-180 days |
| Sumac | Derived from the Koombana variety introduced by L. WRAY. | 119 days (25 years) | 110-125 days | — |
| Atlas | Originated as a selection from the progeny of a cross between Black-hull Kafir (grain sorghum) and Sourless sorgo. | Mid-season to late | — | — |

⁽¹⁾ E. PARISI describes a **Black Orange** with black glumes and large kernels, maturing in 120-140 days and

TABLE III (continued).

| Height | | Description | Observations | Synonyms |
|--|--------------------|--|--|---|
| According to VINALL, STEPHENS and MARTIN | In Italy | | | |
| Mid-tall to tall | — | Stems mid-stout; tillers freely; branches mid-freely; panicles erect, mid-size, dense or mid-compact, cylindroid; glumes black to reddish brown; kernels reddish brown where exposed but lighter in colour underneath the glumes, obovoid. | Very hardy, good resistance to wind, good yield in cane and kernels, but low sugar content (E. PARISI). | Honey Drip. Golden Drip. Silver Drip. Japanese Honey drip. Japanese Ribbon Cane. Texas Seeded. Ribbon Cane. |
| 68 inches (10 years) | — | Stems mid-slender to mid-stout; panicles mid-size to small, erect, mid-compact approaching cylindroid but sometimes ellipsoid; glumes shiny, colour varying often in the same head from straw colour through reddish brown to black on the second glume, the first glume usually being lighter; kernels reddish brown, ellipsoid to ovoid. | — | Early Orange. |
| 71 inches (14 years) | — | Stems mid-stout; tillers and branches freely; panicles erect, mid-compact, ellipsoid to cylindroid; glumes straw-coloured often tinged with reddish brown; kernels light buff to light brown with conspicuous spots of dense brown. | Resembles Orange but has lighter-coloured kernels and glumes. | African Millet White Orange. |
| 82 inches (12 years) | Can exceed 13 feet | Stems mid-stout; tillers freely; branches sparsely; panicles erect, mid-compact, obconoid to cylindroid, short; glumes brownish black, kernels white with small reddish brown spots, ellipsoid. | Easily lodged by wind, usually low sugar content (E. PARISI). | White Mammoth. |
| 72 inches (22 years) | — | Stems mid-stout; tillers freely; branches sparsely to mid-freely; panicles small, erect, compact, cylindroid; glumes black to reddish brown; kernels dark reddish brown, obovoid to globose. | Good resistance to wind; not considered good syrup yielder (E. PARISI). | Red Top. |
| 70 inches (average) | — | Stems mid-stout; tillers freely; branches mid-freely; panicles erect, mid-compact, ellipsoid to cylindrical; glumes black; kernels white with reddish brown to black spots, obovoid to globose. | Very high resistance to wind; sparrows are very fond of the grain, sometimes taking the whole harvest (E. PARISI). | — |

a **Red Orange** with red glumes, less hardy and earlier than the first.

TABLE III (Continued).

| Variety | Origin | Maturity | | |
|--|--|--|----------------------|------------------------------------|
| | | According to VINALL, STEPHENS and MARTIN | According to Cogwill | In Italy |
| Kansas Orange | Origin undetermined. Selection and purification was carried out at the Kansas Experiment Station. | Mid-season to late | — | 145-155 days |
| Honey | Probably descended from the Vimbischiuapa variety introduced by L. WRAY. | 124 days (18 years) | 125-135 days | 145-155 days |
| Gooseneck | Probably descends from a variety introduced by L. WRAY from Natal. | Very late | 125-150 days | 130-150 days |
| Bondeno R. 32 ⁽¹⁾ | Origin undetermined, selected by the 'Società Saccarifera Lombarda' at Bondeno. | — | — | 120-135 days |
| Rosso Lombardo ⁽²⁾ | Selection made by E. PARISI from Early Orange obtained from Missouri. | — | — | 120 days |
| Early Lombardy Black | Probably a natural cross between Early Orange and Early Amber , discovered in a field of Rosso Lombardo at Milan (E. PARISI). | — | — | Earlier than Rosso Lombardo |
| Rosso Forlì | Isolated from an Early Orange imported from the United States into Italy. | — | — | Early |

⁽¹⁾ Indicated by A. ALDOVRANDI.

TABLE III (continued).

| Height | | Description | Observations | Synonyms |
|--|------------|---|---|--|
| According to VINALL, STEPHENS and MARTIN | In Italy | | | |
| 78 inches (15 years) | --- | Stems mid-stout; tillers freely; branches mid-freely; panicle erect, mid-compact, cylindroid to ellipsoid; glumes reddish brown in one strain and black in another; kernels reddish brown with dark spots, ellipsoid. | Prolific seed bearer; poor resistance to wind (E. PARISI). | --- |
| 87 inches (15 years) | --- | Stems stout; tillers freely; branches mid-freely; panicle large, erect, very effuse, conoid; glumes reddish brown; kernels reddish brown, ellipsoid to obovoid. | One of the most productive varieties; poor resistance to wind and <i>Pirauista</i> and <i>Sesamia</i> (E. PARISI). | Japanese Cane. Japanese Seeded Ribbon Cane Japanese Honey Drip. Sprangle Top. |
| Very tall! | --- | Stems stout; tillers freely; branches mid-freely; panicles mid-size, erect, inclined or recurved, mid-compact; obovoid; glumes black with reddish brown tips; kernels dark reddish brown, ellipsoid or approaching globose. | High sugar content even when not ripe but easily broken by wind. | Texas Seeded Ribbon Cane |
| --- | 10-13 feet | Inflorescence brick-red, cone-shaped; glumes reddish black and shiny; kernels wine-red in colour. | Average weight of the cane with sheath: 500 g. | --- |
| --- | --- | Panicles compact, fusiform or cylindroid; glumes short, shiny, bright red or brownish red; kernels reddish brown. | Good steady yield-er, high sugar content. | --- |
| --- | --- | Panicles long, not very compact, similar to Sugar Drip , glumes shiny black; kernels dark red, ellipsoid. | --- | --- |
| --- | --- | Panicles compact, bright red; glumes shiny red; kernels reddish colour, ellipsoid. | Higher yield of grain than Lombardo Rosso and Early Lombardy Black , but with a slightly lower sugar content. | --- |

(*) This and the following are cited and described by E. PARISI.

TABLE III (conclusion).

| Variety | Origin | Maturity | | |
|----------------------------------|---|--|----------------------|----------------------------------|
| | | According to VINALL, STEPHENS and MARTIN | According to COGWILL | In Italy |
| Sumac Milano | Selected from Sumac at the Istituto di Industrie Agrarie della R. Università di Milano . | — | — | Fairly early |
| Hastings | Not indicated | — | — | 120 days |
| Hastings Texas | Not indicated | — | — | 120 days |
| Hodo | Not indicated | — | — | — |
| Seed | Not indicated | — | — | — |
| Iceberg | Not indicated | — | — | — |
| Japanese Ribbon | Not indicated | — | — | Mid-season |
| Black Orange | Not indicated | — | — | 120-140 days |
| Red Orange | Not indicated | — | — | Earlier than Black Orange |
| Black Amber | Not indicated | — | — | Very early |

TABLE III (conclusion).

| Height | | Description | Observations | Synonyms |
|--|--------------|--|--|----------|
| According to VINALL, STEPHENS and MARTIN | In Italy | | | |
| — | — | Panicles nearly always conoid, compact; fertile spikelets inerm; sterile spikelets short, yellowish colour; glumes red, small; kernels spheroid, red-brown, slightly larger than those of Sumac . | Suitable for region; subject to wind and summer storms; higher sugar content and more productive than Sumac . | — |
| --- | --- | Panicles small and compact; glumes opaque red in colour; kernels light red. | Fairly resistant to wind (E. PARISI) | --- |
| --- | --- | Panicles mid-compact; upper glume black, lower glume light yellow. | More hardy, but with a lower sugar content than Hastings ; high grain yield-er (E. PARISI). | --- |
| --- | --- | Stem stout and tall; panicles ellipsoid or conoid, very heavy; glumes chestnut colour; kernels light yellow. | Very hardy but of little industrial value (E. PARISI). | --- |
| --- | --- | Panicles long, intermediate between Sapling and Sugar Drip ; glumes triangular, not very long, dark red colour; kernels chestnut in colour. | High yielder in both cane and grain, relatively poor in sugar. | --- |
| --- | --- | Panicles small, mid-compact; glumes dark chestnut colour; kernels chestnut, ellipsoid. | Sweet variety but of little industrial value; not resistant to wind (E. PARISI). | --- |
| --- | --- | Stems slender; panicles compact, obconoid; glumes chestnut colour; kernels light yellow, reddish; plant resembles Kansas Orange and Black Orange . | Very high sugar content; not very resistant to wind (E. PARISI) | --- |
| --- | --- | Stems stout; panicles compact, slightly open at the top; glumes black; kernels large. | Very high sugar content (E. PARISI) | --- |
| --- | Rather short | Panicles ellipsoid, compact; glumes reddish in colour; kernels ellipsoid. | Less valued and less hardy than Black Orange (E. PARISI). | --- |
| --- | Medium | Tillers freely; stems slender; panicles effuse, not very large; glumes black; kernels a more or less dark yellowish colour. | Little resistance to wind. | --- |

Centre of the Institute of Agricultural Industries, R. University of Milan. An endeavour is being made to isolate the homozygotes transmitting their biological and morphological characteristics as well as a stable sugar content. Studies on the plants regard the different botanical characteristics (length of growth period, height, number of nodes, characteristics of the leaves, weight of the stalks, shape of panicle, seed production, resistance to diseases and pests, etc.) and industrial characteristics (chiefly content in sugar and accessorially in cellulose). On the basis of the latter different groups are classified:

(1) Plants differing manifestly in the characteristics typical of the variety from which the seed originated: these are carefully studied and examined with a view to isolating the plants having a high sugar content, and those which, with a lower sugar content, show valuable biological or somatic characteristics (precocity, weight of stalks, seed production, etc.).

(2) Plants presenting the external characteristics of the variety cultivated are divided into two groups: the first includes all plants which have a sugar content lower than 19° Brix and which are eliminated. The plants of the second group are divided into two: first all canes weighing less than 500 g. are eliminated, keeping the 20 plants having the highest weight and Brix (21-22°); the seeds of these plants are sown separately with a view to studying their progeny. The remaining plants serve for mass propagation.

Without awaiting the results of genealogical selection, Prof. E. AVANZI has, since 1937, made several varietal crosses at the San Michele all'Adige Experiment Station (Trento).

At the beginning of October, 1940 the Farmers' Association established a Research Centre for the study of sorgho (Centro di Studie di Ricerche per il sorgho zuccherino) attached to the 'Istituto delle Industrie Agrarie' at the Milan University. This Centre, financed by the Ministry of Agriculture and Forests, the Farmers' and Farm Workers' Association as well as by interested industrial firms, will concentrate mainly on genetical research and cultivation methods with a view to improving productivity and yield characters, depending on differing environmental conditions.

Choice of variety in Italy.

In all the experiments carried out in Italy, the late varieties have given the best results in weight and in sugar per hectare. On the other hand, the seed production of these varieties is less and also uncertain (bird attack). The late varieties also show a greater resistance to the European corn borer and the yellow stalk borer and to plant parasites. The percentage of sugar is in direct proportion to precocity, and in the same variety, the highest percentages are obtained on dry soils.

As regards choice of variety in the different regions, Prof. G. DE MARZI advises as follows:

In Southern Italy irrigation is necessary in sorgho cultivation; with sufficient water and the high temperature, growth is luxuriant. Here the late varieties give a better cane yield with a sugar content equal to that of early varieties. There is no restriction in choice of variety; this depends solely on type of rotation

followed. In Northern Italy there is sufficient moisture. The cold and spring rains may check early growth, the rains or the summer dryness may favour or slow down growth, the autumn rains and rapid fall in temperature may delay maturity, but despite all these factors, production is certain. In Northern Italy, semi-early varieties are used, taking into account the rotation employed.

In Central Italy two zones are distinguished:

(1) the zone with a sufficient rainfall to ensure successful cultivation; here the position is similar to that in Northern Italy, with the added advantage that late varieties can also be used as the planting date can be advanced and that conditions are more favourable for maturation:

(2) the zone with an insufficient rainfall; in this case, late varieties have to be used. These will benefit from the rare spring rains for germination and early growth and from the autumn rains for the renewal of growth which is rapid, vigorous and practically free from parasite attack. Contrary to expectations, in this zone early varieties were a failure, also being heavily infested with the yellow stalk borer.

(To be concluded).

A. HANCK

CITRUS IN MOROCCO AND TUNISIA

This article continues the series on citrus in different countries, following on Spain, Brazil, South Africa, Australia, United States, Palestine, the U.R.R.S. and Algeria. The results obtained during the last few years in the countries of French North Africa in developing and improving citrus production and trade are discussed. The ever increasing progress made will have an undoubted effect not only on the economy of the two countries in question (Morocco and Tunisia) but also on citrus production in other countries, especially in Europe.

1. — Morocco.

The orange was widely distributed in Morocco well before the establishment of the French Protectorate. It spreads from the coast to fairly high altitudes (800 metres in some sheltered valleys of the Zegzel in eastern Morocco). The citrus species (Ouezzan, Zegzel and Targhijst oranges) which have been cultivated from remote times by the natives can be planted in practically any district; moist soils, however, are not suitable: low alluvial soil, narrow valleys where the risk of frost is greater. In general, the orange groves in North Africa are frequently exposed to dry winds which cause fruit and leaf-fall.

The native groves distributed throughout the country cover some 1,800 hectares with a total of 520,000 trees, which gives a density of 289 trees to the hectare. The first European plantations were established in 1922 and, in 1926, 300 hectares were already under citrus. At the end of 1938, the area of European plantations amounted to 5,614 hectares—3,300 ha. oranges, 1,700 ha. clementines, 450 ha. mandarines, 119 ha. lemons, 25 ha. grapefruit and 20 ha. other citrus species. A large part of the citrus plantations in Morocco have not yet come into production. The number of orange trees to the hectare averages 250.

Production centres. — The chief citrus production centres are, in order of importance, Meknès, Rabat, Gharb, eastern Morocco (Zegzel Valley), Casablanca, Chaouïa, Marrakech and Fès.

The Meknès region is to become an important centre of orange cultivation; in this part, the conditions for citrus growing are very favourable, in particular the total absence of frosts, deep soils free from salt, supply of fresh water, dry climate which checks the development of cryptogamic diseases and citrus pests (especially scale insects). The centre of cultivation free from frost, comprises the zones placed at an altitude below 500 metres; in the Meknès region, it is thought that in the near future it will be possible to plant several thousand hectares. The plantations of this region when well placed are distinguished by exceptional vigour of plant growth and the excellent appearance and quality of the fruit. The majority of citrus growers belong to the 'Société Coopérative Citrus Production Sebaa-Aoium'. This association sees that the very severe rule regarding restriction of varieties and grading of the fruit is observed. The varieties authorized by the Cooperative are: oranges—Navel and Valencia Late; mandarines—Clementine and Algerian Mandarine; grapefruit—Marsh Seedless. From the commercial viewpoint, these varieties present many advantages: uniformity in production, good quality and excellent appearance of the product, and can also be placed on the market before (Clementine Navels) or after (Valencia Late) the period of maximum production in Spain.

The total citrus production in Morocco now averages about 350,000 quintals per annum, 250,000 qls. being absorbed by local consumption and the remainder exported. Local consumption could be increased to 500,000 qls. per year.

Orange production per hectare is estimated at 50-60 quintals in the third year of planting; 80-100 quintals in the fifth year and 150-200 quintals in the 8th year. For mandarines and clementines the following figures are given: 80-100 qls., 100-150 qls., 180-200 qls.; and 70-90 qls., 100-200 qls., 170-220 qls. respectively.

Varieties. — The chief orange varieties cultivated are Thompson Navel, Washington Navel, Ovale Double, Fine Sanguine and Valencia Late; the chief mandarine varieties are Mandarine de Blidah and King of Siam; the Algerian clementine is also very popular now.

The varieties of American origin, Washington and Thompson Navel in particular, become adapted to the Moroccan climate very easily. A very rigorous selection of the grafts intended for the propagation of these varieties is necessary, however, to maintain the original quality of the fruits.

In recent years, the tendency has been to establish groves almost entirely of early varieties; a certain number of hectares have been planted with late varieties, but the mid-season varieties (February-April) have been practically abandoned. It would be advisable, however, to change this system in future plantations, as graduated production is indispensable.

For seedless fruit, the clementine is now planted in homogeneous plots, at some distance from other citrus species and especially the mandarine, the pollen of which is more active than that of other citrus species. The orange varieties with sterile pollen, Washington Navel and Thompson Navel, and to a certain extent the Jaffa, can not only be planted near the clementine trees with

advantage but also act as a barrier between the mandarines and clementines. If mandarine cultivation is desired, at the same time ensuring seedlessness in the clementines, it is necessary to plant a strip of land 400 metres wide between the two groves with sterile pollen varieties and also to establish a very dense and high windbreak. In the mixed plantations already established, the only remedy is to topgraft the mandarines.

Genetic studies on the fruit species of Morocco have been carried out, *inter alia*, by MM. LACARELLE and MIEDZYRZECKI since 1933, and several varieties of indigenous and imported oranges together with other citrus species have been selected. These workers also studied the value of different stocks and their influence on the scion, and have made a large number of hybridizations with a view to obtaining new varieties and stocks. Particular importance was given to the study of polyembryony and its effect on citrus stocks. Numerous crosses using indigenous and commercial varieties have been effected with a view to obtaining a mid-season variety of orange having good growth, high yields and fruits which can be marketed after Navel and before blood oranges.

Some thirty years ago, owing to the damage caused by foot rot and gummosis, *Poncirus trifoliata* or *Citrus triptera* was used as stock but, due to the difficulty in obtaining successful grafting, was later abandoned. The stock generally employed at present is the Seville or bitter orange (*C. vulgaris*); this variety is easily grown from seed, has a tap-root system, vigorous growth, fuses completely with all cultivated citrus species and varieties, is easily grafted and adapts itself to widely differing cultural conditions, only failing in excessively compact and moist soils. The Seville orange is also the best stock for the clementine. Shaddock and the Florida lemon are only used in exceptional cases.

As regards the citrus varieties advocated for commercial plantations, M. LACARELLE, Director of the Fruit and Vegetable Research Institute, in 1937 published a brochure on the results obtained during five years experiments (1933-37).

For early orange varieties, the Washington Navel is advocated as it has given the best results; this variety is widely distributed in Morocco and forms the basis of the commercial groves. The Thompson Navel is grown to a lesser extent.

Among the mid-season varieties are Cadena sin hueso introduced from Spain and the Petit Jaffa; it is considered that these varieties will have a commercial importance. The blood orange varieties are many and vary considerably in quality; the Sanguine du Portugal is recommended for cultivation. As regards late varieties, Valencia Late remains the sole variety for the present.

The clementine orange has become very popular on the French markets; the clementine should be planted in regions where the soil and climate are very favourable, taking great care in grafting. The Blidah mandarine is still the most important of the varieties grown or recently introduced.

Among the lemon varieties, the following are recommended: the Sicily lemon, which has the most graduated fruiting, the Eureka, the Lisbonne and the so-called 'four seasons' variety.

The grapefruit which has already conquered the markets of the United States, Great Britain, Canada, etc. is becoming increasingly popular in France. Marsh Seedless is the only variety recommended for commercial planting.

Exportation. — In view of the considerable advance made in fruit-growing, regulations were drawn up regarding the fruit intended for export. Before 1930, many plantations were established rather at random, without taking into consideration that before venturing into commercial planting, it is necessary to study acclimatization and varieties, and to establish nurseries which can supply abundant selected material. By 1936, there were six experiment stations for fruit-growing in Morocco, each having a surface area of about 20 hectares and situated at Marrakech, Fès, Aïn Zaoujdat, Berkane, Immouzer and Tafrant. The three first-mentioned stations specialize in citrus research.

The botanical research work carried out by the Agricultural Services for many years has shown in that Morocco fruit-growing can be developed very considerably and thus play an important part in the agricultural economy of the country.

In April, 1932, the Government of the Protectorate decided to export quality fruit only. The 'Office Chérifien du Contrôle et d'Exportation' (O.C.E.) was then formed and charged to carry out this policy. This Office is both technical and economic. The technical side consists in carrying out in selected regions and on a determined area, experiments designed to improve the existing fruit and market garden varieties, and also in obtaining new fruit varieties in collaboration with the experiment stations and the chief planters, and finally the selection of improved varieties and the study of other improvements which can be made in fruit-growing. On the economic side the following aims are kept in view: (1) establishment of standards for all products placed under the control of the Office; (2) control of exports; (3) conferment of the 'Marque nationale chérifienne' on all 1st grade products; (4) refusal of all goods not up to standard; (5) search for new markets for Moroccan products and study of improvements which can be applied in the trade of fruit and market garden products.

In 1933, 800,000 consignments were inspected; this figure has now increased to over 4 million a year. At present, about a hundred products pass through the hands of the O.C.E., and for each category of products a decree stipulates the quality, degree of ripeness, method of packing, etc., to which the producers are obliged to conform.

By Vizirial Decree of August 25, 1939, a supplementary and provisional tax of 15 francs per ton is levied by the Customs office on behalf of the O.C.E. on all citrus products exported.

The Pomology Committee established by the Director of Economic Affairs, decided, at the meeting of January 26, 1937, to study the following questions: (1) selection and registering of stools of late citrus varieties (Late Valencia and blood oranges) still productive and which appear to be suitable for grafting; (2) determination per region of the species and varieties best adapted to the environmental conditions prevailing.

Improvement in fruit production necessitates a study of the best means of adapting a small number of good varieties to environmental conditions and in regard to soil, climate, stocks, pollination, diseases and pests, etc. Economic improvement involves the study of fruit types as regards facility in treatment,

harvesting, lopping, thinning, soil operations, etc. The commercial aspect regards size, flavour, colour, storage, resistance to handling and transport, etc.

A recent Decree of the Director General of Agriculture at Morocco determined the conditions to be observed henceforth in the export of Moroccan oranges. Before dispatch, the appearance, colour and quality of the oranges are to be inspected. The minimum diameter is 55 mm. and the fruit will be sorted into eleven grades according to diameter (from 57 to 92 mm.). Two grades will be 'de luxe oranges' and 'selected oranges'. Each consignment should contain only one grade of fruit and not be mixed. Only packing cases of standard weight and dimensions are allowed. All oranges for export should be wrapped separately in tissue paper, stamped with the name of the production centre and that of the grower. All consignments should be marked indicating the grade of orange according to size, according to quality, the name of the variety and the number of fruits contained therein. The cases, boxes and crates containing oranges corresponding to the above-specified conditions will be stamped with the Moroccan national mark.

By Decree of the Director of Economic Affairs dated July 2, 1938, the use of the Californian type of packing case of about 30 kg. was made compulsory. Formerly, oranges were exported in cases of 10 and 20 kg., usually 20 kg.; only mandarines and clementine oranges were packed in lots of 10 kg.

The oranges for which there is the highest demand are grades 7, 8 and 9 of the Moroccan standard (fruits weighing 100 to 150 grams and with a diameter of 63 to 67 mm.).

Citrus exports in Morocco have increased continually in the last ten years. In 1930, total citrus exports did not attain 3,000 qls. per annum, while today exports exceed 125,000 qls.—77 per cent. oranges, 20 per cent. clementines and mandarines, and 3 per cent. lemons. These exports are all to France.

On January 12, 1938, the Moroccan Citrus Association (Syndicat marocain des Agrumes) was established with headquarters at the Chamber of Agriculture, Rabat. This association concentrates chiefly on trade and export problems. It studies, prepares and facilitates the organization of packing and sales co-operative societies, coordinates the activity of these organizations and collaborates with the Federation of Arboriculturists' and Horticulturists' Associations of Morocco.

The possibilities of Morocco as regards fruit and market garden crops are very considerable, because—contrary to other countries of Africa—its natural conditions are very favourable. In the north, Morocco is washed by the Mediterranean, in the south, it is protected by the Atlas Mountains from the hot desert winds and supplied with water-courses and subterranean layers of water which, in the dry periods, are an important reserve stock. In the west, the passage of the Canary Islands current along the coast mitigates the excessive heat, making Morocco a very temperate country with tropical characteristics.

2. — Tunisia.

Citrus cultivation in Tunisia is not so important as in Algeria and Morocco. In the two latter countries, the majority of the citrus plantations are owned by European colonists, while in Tunisia, over 80 per cent. of the land under *Citrus*

is in the hands of the natives. The European colonists in Tunisia have given little attention to arboriculture, concentrating on cereal-, olive- and wine-growing.

In 1938, citrus plantations covered 2,000 hectares—1,347 ha. oranges, 280 ha. mandarines and clementines, 300 ha. lemons and the remainder pomelos, citrons, bitter oranges, etc. Oranges form 67.5 per cent. of the citrus plantations.

Of this total of 2,000 hectares, on 65.6 per cent. the trees are over 10 years, on 14.8 per cent., 5 to 10 years, and on 19.6 per cent. the trees are under 5 years.

Sixty per cent. of the plantations are situated in the Cap Bon region, 24.6 per cent. in the Tunis district, 7 per cent. in the Bizerte and 6 per cent. in the Sousse districts, 2.4 per cent. in the south and the oases. Forty-seven per cent. of the citrus plantations cover a surface area of one hectare or less; 23 per cent., from 1 to 5 ha.; 14.5 per cent., from 5 to 10 ha.; and 16 per cent. over 10 ha. One of the chief causes which limits increase in citrus cultivation in Tunisia is the shortage of water for irrigation.

The total average citrus production at present amounts to 150,000 quintals per annum—82 per cent. oranges, 9.5 per cent. mandarines and clementines and 8.5 per cent. lemons. The average yield in fruit, taking into consideration that there are 1,600 hectares in bearing, may be estimated at 94 quintals per hectare. If the native groves were not so densely planted, higher yields would be obtained. Local consumption absorbs 80,000 quintals of citrus fruit per annum, but could be increased to 140,000 quintals.

The Agricultural Service and the Botanical and Agronomic Service of Tunisia carry out investigations on the improvement of varieties for propagation and give useful advice to the planters. To improve the existing groves, selective grafting is necessary. Experiment groves for selection work and cultivation trials were established.

Fruit standardization.—Up to 1930, citrus plantations in Tunisia showed no homogeneity, which made it practically impossible to standardize the fruit. Exports decreased every year and finally led to the Tunisian Government establishing a Service for fruit and market garden crops, which decided to standardize cultivation, restrict the number of varieties cultivated, eliminate many of the plants of no commercial value, etc.

Contrary to Morocco, the majority of the Tunisian groves are formed of mid-season varieties, that is, varieties ripening in January-March (Maltese semi-blood orange, Maltese Blond, etc.). The Maltese oranges give excellent results.

Heavy losses often occur in the annual yield of clementines and mandarines owing to *Ceratitis capitata* infestation. The lemon grows very well in some districts along the coast.

In January, 1934, the Tunisian Standardization Office (O. T. U. S.) was created with the object of (1) establishing the 'Tunisia' trade-mark, granting its application under proper control, and making it known through propaganda (2); determining for each product the regulations regarding the standards adopted, the conditions regarding the use of the trade-mark by exporters, control measures and restrictions governing exports (3) facilitating the application of the trade-mark by combined action with the Agricultural Services with a view to improv-

ing the production and treatment of the agricultural products intended for export; (4) improving, in collaboration with the railway and shipping companies, methods of transport and handling; (5) ensuring the cooperation of representatives or agents at the principal external markets interesting Tunisia, in order to facilitate the marketing and distribution of standard products by giving the exporters immediate and concise data on the position and trend in the said markets; (6) seconding these efforts by trade publicity adapted to the type of exports in question with a view to assisting the marketing of the agricultural products stamped with the Tunisian guaranteed trade-mark; (7) carrying out all the requisite work involved in the participation of Tunisia in the different shows and exhibitions for propaganda purposes.

The high price obtained for citrus fruits on the French market since 1936 after the Spanish War has encouraged production in many zones of the Regency. The natives, who instinctively dislike all progress, have given more attention, however, to this crop. Regulations regarding the export of the excess crop to France have been established.

Present exports, absorbed entirely by France, amount to 70,000 quintals per annum—70 per cent. oranges, 23 per cent. mandarines and clementines, and 7 per cent. lemons. Several citrus growers' associations have already installed graders with a capacity of 15 tons per day together with 15 packing machines.

Before fruit cultivation can be established in the different parts of the Regency, a long period of research and experimentation will be required. The wine-growing depression in Tunisia which has taken place in the last few years and which will necessitate restriction and even partial destruction of the vines, has been compensated by the cultivation of fruit trees, in particular stone fruits, which are recognized as being the most suitable for the environmental conditions of the wine-growing regions of Tunisia.

In encouraging fruit cultivation in Tunisia, the following points require careful study: (1) determination of the crops to be cultivated, taking into consideration the agricultural conditions of the different regions; (2) selection and maintenance of stocks; (3) control of production and prevention of goods flooding the market, if necessary coming to some agreement with Algeria and Morocco.

The chief problem in the French possessions in North Africa is that of obtaining the production of good quality fruit at the lowest possible cost. At present, these possessions supply France with 25 per cent. of her total imports in oranges, 92 per cent. mandarines and 8 per cent. lemons. Grapefruit production in French North Africa for the moment is negligible and French requirements (60,000 quintals per annum) are at present obtained from Palestine.

According to a recent enquiry, it is considered that the possibilities of a further development in citrus cultivation in Tunisia, although limited by shortage of water, are fairly good particularly in the zone about Djebel Abderhamane, at Bizerte and Tunis, where citrus cultivation could be increased to 15,000-16,000 hectares with an annual yield of 1.5-1.6 million quintals.

ORGANIZATION OF MILK RECORDING IN JAPAN

Following the articles on the Netherlands (February, 1940), Hungary (March, 1940) and Lithuania (September, 1940), this is the next in the series and has been drafted from the information supplied by the Ministry of Agriculture and Forests of Japan.

Development of milk recording.

Cattle herdbooks were introduced into Japan in 1907 by the Japanese Jersey Cattle Club which in that year started pedigree registers without, however, as yet taking into account milk recording. In 1911, when the Dutch Cattle Association of Japan was founded, herdbooks were started for the Holstein breed, conformation and individual yield both being registered. This marks the beginning of milk recording in Japan.

After its foundation in 1918, the Central Animal Husbandry Association absorbed the above-mentioned organizations and modified the rules formerly in force. While up to 1918, for the Holstein breed, the formula 'approved cows' was reserved for those animals which were registered both for conformation and yield, in that year it was decided to confer this title on cows included in the herdbooks having been examined for conformation and whose milk yield exceeds a certain level. In 1920, The Central Animal Husbandry Association also authorized the registration of the Ayrshire breed.

After 1918, the Federation of the Animal Husbandry Associations of Hokkaido also started herdbooks independently of the other organizations. Milk recording was carried out for cows of the Holstein, Ayrshire, Jersey, Guernsey, Shorthorn and mixed breeds, at the same time reserving a 'register of approved cows' for the Holstein breed. In 1932, the herdbook registering carried out by the Federation was assumed by the Central Association in order to make the work as uniform as possible.

All these organizations concentrate chiefly on the selection of breeding animals with a view to improving their cattle breeds. There are also Cooperative Cattle Breeding Associations and cooperative Dairy Associations spread throughout the country, which record milk yields in order to ascertain the best milch cows and improve the dairy industry.

Particular attention is given to the economic side of the question. The work of these organizations consists in calculating the quantity of forage consumed by the animals and recording the yield of milk obtained, after which the relation between the two results is determined.

Considerable progress having been made in cattle breeding as a result of milk recording as then practised, the Government of Tokio in 1937 promulgated a regulation encouraging the use of herdbooks and the establishment of milk recording associations properly so called.

Organization of milk recording.

The following table indicates the organizations engaged in milk recording in Japan in 1939, and the number of recorders employed:

TABLE I. — *Milk recording organizations.*

| | Number of centres | Number of recorders |
|---|----------------------|------------------------|
| Central Animal Husbandry Association of Japan | 1 | 130 |
| Federation of Animal Husbandry Associations of Hokkaido . . | 1 | 5 |
| Milk recording associations | 13 | 13 |
| Cattle breeding associations | 4 | 4 |

In milk recording the following are calculated:

- (1) Quantity of milk obtained;
- (2) butterfat content;
- (3) quantity of forage consumed.

The quantity of milk is generally determined by weight (in kg.), the Federation of Animal Husbandry Associations of Hokkaido, however, calculate according to capacity [in koku (*)].

Milk recording by these different organizations is carried out by the recorders or by the proprietors whose assistance is authorized except in the case of the Hokkaido Federation. In every case, milk records are checked.

The period of milk recording varies according to organization. The milk recording and the cattle breeding associations carry out recording throughout the lactation period, records being taken at least every twenty days; recording is stopped when the daily yield is below 4 kg. The Federation of Animal Husbandry Associations of Hokkaido, however, established different periods, according to circumstances, of 7 days with daily examination, of 30 days, 10 months and a year with examination every 15 days. At the Central Animal Husbandry Association of Japan, the recording period lasts either 30 days with examination every 15 days, or six months or a year with examination every 20 days; recording stops if, before the end of the period, the daily milk yield is less than 4 kg.

In determining the quantity of milk produced, usually the average of each day's yield is taken; the Federation of Animal Husbandry Associations has quite another system—the quantity of milk produced the last day of the recording period is considered as the average daily yield.

* 1 koku = 1.80391 hl.

Throughout Japan, the determination of the butterfat content is carried out by recorders who take either the entire yield of the day or only that of one milking for examination. Generally the sample is tested *in situ*, that is, in the stable, though the milk recording and cattle breeding associations often carry out testing at the cooperative dairies or other agricultural industrial establishments. In every case, the Gerber and Babcock methods are employed, and the result is determined on the basis of the butterfat percentage of the last testing. At the end of the recording period, the data obtained are entered in the herdbook and the results above a certain level are noted in the Register of Merit.

From these data, the Central Animal Husbandry Association awards testimonials and, with the cattle breeding associations carrying out milk recording, distributes prizes to the proprietors of the best cows.

The recording of the quantity of forage consumed is effected by the milk recording associations and a few cattle breeding associations also carrying out milk recording.

There are two types of register: the Register of Merit and the Yield Register. To be entered in the herdbook, cows must have correct conformation and attain a certain level in milk yield.

As regards financial resources, the Government grants a subsidy to all the milk recording organizations with the exception of the Federation of Animal Husbandry Associations which is maintained by a grant from the regional authorities. This grant is also given to the cattle breeding associations carrying out milk recording. The milk recording associations and the cattle breeding associations also have the fees paid by their members.

Results of milk recording.

The following tables list the ten cows having the highest yield in milk and butterfat respectively.

I. — *Quantity of milk (from one year's recording).*

| Order | Name | Quantity of milk in kg. | Quantity of butterfat in kg. |
|-------|--|-------------------------------|---------------------------------------|
| 1 | Chunkey Piebe Idleaze | 15,216 | 567.3 |
| 2 | Island Bonheur Inka | 14,684 | 489.7 |
| 3 | Romeo Pieterje Dosie Ormsby | 14,065 | 604.5 |
| 4 | Portage Walker 2nd | 14,058 | 446.9 |
| 5 | Dora Queen Romeo | 13,580 | 380.6 |
| 6 | Queen Chunkey white Hendrick | 13,566 | 450.4 |
| 7 | Sir Johanna De Kol Lunde | 13,561 | 439.9 |
| 8 | Dutchland Johanna Ormsby | 13,336 | 431.4 |
| 9 | Hazeltine Bonheur Beets | 13,252 | 490.2 |
| 10 | Kate Spray Queen 2nd | 13,111 | 447.2 |

2. — Quantity of butterfat (from one year's recording).

| Order | Name | Quantity of butterfat in kg. | Quantity of milk in kg. |
|-------|--|------------------------------|-------------------------|
| 1 | Romeo Pietertje Dosie Ormsby | 604.5 | 14,065 |
| 2 | Chunkey Piebe Idleaze. | 567.3 | 15,216 |
| 3 | Queen Hendrick Tosen. | 531.1 | 12,071 |
| 4 | Calamity Minnie Ormsby 2nd. | 527.9 | 12,060 |
| 5 | Duplicate Uneeda 2nd. | 522.4 | 12,280 |
| 6 | Ida Lotta Korndyke 3rd. | 502.4 | 12,267 |
| 7 | Segis Homestead De Kol | 497.8 | 12,782 |
| 8 | Grahamholm Bess Burke Pobes. | 496.5 | 11,051 |
| 9 | Hazeltine Bonheur Beets | 490.2 | 13,252 |
| 10 | Island Bonheur Inka | 489.7 | 14,684 |

S. GAUTHIER-CLERC

MISCELLANEOUS INFORMATION**International Institute of Agrostological Research.**

At the 11nd Agronomy Congress held at Rio Grande do Sul (Brazil), Victor C. del MAZO presented a proposal for the establishment of an Institute for Agrostological Research on the pampas region of South America. The proposer, after having pointed out the importance and pastoral possibilities of this region and discussed questions of soil erosion, progressive exhaustion of soil fertility and degeneration of the grasslands, suggested establishing an Indo-American Institute. The Sub-Committee for Agrostology, after discussing the motion, proposed its adoption by the Congress and its transmission to the authorities concerned, with a view to making the necessary arrangements for its materialization.

A. II.

Use of fertilizers in the chief sugarcane regions.

M. D. Kervégant, Chief of the Agricultural Service at Martinique, has published in the *Bulletin agricole de la Martinique* (Vol. VII, No. 3-4 and Vol. VIII, No. 1) a comprehensive monograph on the use of fertilizers in sugar cane cultivation. His conclusions which we reproduce here will be found interesting.

SOUTH AFRICA

The majority of the sugarcane plantations in South Africa are situated in the subtropical zone. Plant cane and ratoons are harvested at 20-24 months, and only in exceptional cases at 12-15 months. Formerly, re-planting was carried out immediately after removing the last ratoon, but now the ground is left fallow for a year. During this period several successive crops of green manure are usually grown. The manure obtainable on the estate is used though only small quantities are available; press-cakes are also utilized, usually at the rate of 10 tons per acre in fields not situated too far from the mills. The quantity of chemical fertilizers used varies from 450 to 900 kg. per hectare for plant cane and from 225 to 600 kg. for ratoons. In general, ratoons are only given phosphoric acid in the form of superphosphate. Usually, plant cane receives a complete fertilizer, though sometimes only a phosphatic fertilizer, the soils of the Union of South Africa being particularly poor in phosphoric acid.

FRENCH WEST INDIES

After the plant cane which lasts for 16-18 months, follow from one to five ratoon crops. After the last ratoon crop, clean fallow is usually maintained for one or two years. Cane trash is rarely burnt but usually dug in between the rows. From 15 to 20 tons of pen manure per hectare are applied to plant cane (occasionally 35 to 40 tons on the light soils in the north of Martinique). As the quantity of pen manure available is insufficient, only the more important and easily accessible areas are manured. If manure is not given, frequently 200 to 400 kg. per hectare of an organic fertilizer, sheep dung or guano, are applied. Press-cake is rarely used as fertilizer and only in the immediate neighbourhood of the mill. Pen manure is sometimes, applied before planting, in the pits or furrows where the seed cane is to be placed but is generally applied one or two months later either at the bottom of the planting furrow or in a small circular trench dug around each tuft of cane or else in small ditches dug between the clumps. The quantity of fertilizer elements per hectare supplied by the chemical fertilizers varies more or less within the following limits: nitrogen—100-200 kg.; phosphoric acid—60-160 kg.; potash—100-220 kg. The fertilizers mostly employed are ammonium sulphate, dicalcium phosphate, sulphate of potash or potassium chloride. Some planters make their own fertilizer mixtures from the above raw materials, but the majority buy the prepared product. Usually 1 to 1.5 tons of compound fertilizer are applied per hectare. The quantity and proportion of fertilizers are usually the same for plant cane and ratoons, the latter receiving in addition pen manure.

Chemical fertilizers are generally given in one application, from March to May, when the plant cane is 5 or 6 months old and the ratoons one to two months. Frequently, however, the fertilizer period is advanced to June-July, especially in the case of ratoons. The chemical fertilizer is placed in a pit alongside of the cane clump, or less frequently, in a circular trench around the plant. The fertilizer is lightly covered with earth.

ARGENTINA

Sugarcane cultivation is centred mainly in Tucumán Province, where the climate is subtropical. The canes are harvested at the end of 12 months. After the first ratoon, the field is either planted immediately or left fallow for one to two years. The cane trash is usually burnt after harvesting. Farm manure and press-cake are generally used as fertilizer, though very limited quantities are available. Chemical fertilizers are rarely used, partly because of the relatively high cost (heavy transport expenses), and partly because the soil, in general, is reasonably well provided with fertilizer elements. Experiments carried out at the Tucumán Experiment Station have proved that in calcareous soils, sugarcane shows no response to phosphoric acid and potash applications. Nitrogen gives better results, but the decrease in percentage of sucrose and purity counterbalance the increased tonnage obtained.

AUSTRALIA

Sugarcane is cultivated chiefly in the coastal region of Queensland, and, to a much smaller scale, in New South Wales. In Queensland, plant cane lasts about 15 months, after which two or even three ratoon crops are grown. In New South Wales, the vegetative period of cane covers two years. Cane trash is often burnt before harvesting; after the last ratoon crop, the field is replanted without allowing any fallow period; very frequently, a leguminous green manure crop is grown in order to check the progressive destruction of the organic matter in the soil. In plantations near the sugar

mills, molasses is applied as a fertilizer 4 to 5 months before planting. Usually, a fertilizer containing 5-7 per cent. nitrogen and 14-16 per cent. phosphoric acid is applied at the rate of 450 to 700 kg. per hectare. The fertilizer is applied in the furrow at the time of planting. Later, two or three applications of sulphate of ammonia are given at the rate of 180 kg. per hectare. Ratoons are also given sulphate of ammonia (225 to 675 kg. per ha.).

The red volcanic soils benefit considerably from potash, and alluvial, acid, clayey or silicious soils from phosphoric acid; all soils show a good response to nitrogen. It is considered, however, that the use of nitrogenous, mineral fertilizers for cane planted after a green manure crop is, as a rule, superfluous.

BARBADOS

Sugarcane is cultivated in rotation with cotton, maize and food plants. Heavy applications of pen manure (on an average, 50 tons per hectare) are given to plant cane. When insufficient pen manure is available, organic fertilizers: sheep dung, cottonseed cake, fish meal, are frequently employed. One or two months after planting, a mineral fertilizer corresponding to about 22.5 kg. per hectare of nitrogen is applied, later, at the beginning of the rainy season, a second application of 60 to 90 kg. per hectare. Nitrogen is generally given in the form of sulphate of ammonia. In July, the ratoons are given 125 kg. per hectare of sulphate of ammonia and also very frequently 110 kg. of nitrate of potash. Experiments have shown that it is advisable to reduce the quantity of farm manure to 25-40 tons per hectare and to add, at the beginning of the rainy season, in one application, 66 to 112 kg. per hectare of ammoniacal nitrogen and 88 to 132 kg. per hectare of potash (chloride or sulphate) in order to obtain the maximum yield compatible with the rainfall conditions prevailing.

CUBA

The vegetative period of the cane is about 12 months and ratoon crops are usually continued for 15 to 20 years. The land is then rested (clean fallow). Cane trash, after the harvest, is collected between the rows or left as it is on the ground to check moisture evaporation and weed growth. Farm manure which is not easily available is seldom used. Sometimes a green manure crop is grown before planting the cane. Other organic fertilizers used are press-mud and different seedcakes. Chemical fertilizers have been employed to a small extent, chiefly since the sugar crisis. Black soils which are naturally fertile are seldom manured. The other soils are generally deficient in phosphoric acid. In fact, the formulae generally used show phosphoric acid as the predominating element, with a medium or high proportion of potash and a relatively low percentage of nitrogen. The principal mineral fertilizers used are: sulphate of ammonia, double superphosphate of lime, ammonium phosphate, sulphate of potash and wood ash. Generally, sugarcane is only manured every three or four years.

EGYPT

Cane cultivation in Egypt is limited to the borders of the Nile. Usually, the system is to have one plant cane crop and one or two ratoon crops. Sugarcane is cultivated in rotation with different plants. The fertility of the soil and practice of rotation crops reduces the necessity for heavy manuring. The native farmers use stable manure or village refuse. The fertilizer chiefly used on large estates, however, is nitrate of soda at the rate of 500 to 750 kg. per hectare. This is usually divided into two applications—three months after planting when the cane is 50-60 cm. high, and a month later. The fertilizer is applied by hand at the foot of each plant.

FIJI ISLANDS

Usually one plant cane crop and one or two ratoon crops. The practice of digging in the cane trash has been abandoned owing to shortage of labour, at present only the residue left on the field after the last ratoon crop is dug in. The ratoon crop is followed by one or two green manure crops. In rich soil, no mineral fertilizers are applied. In poor soils, 330 kg. of lime superphosphate and 225 kg. of sulphate of potash per hectare are usually applied. Frequently, 12 to 25 tons of coral sand per hectare are also applied. Ratoons on all soils are given 112 to 225 kg. of sulphate of ammonia per hectare.

FORMOSA

The vegetative period lasts from 18 to 22 months; usually a plant cane crop, rarely a ratoon crop. Sugarcane is cultivated in rotation with rice, potatoes and different legumes. The use of fertilizers is general. The chief fertilizers used are sulphate of ammonia, double superphosphate, and sulphate of potash. Different oil-cakes, especially soybean press-cake are commonly used. Fertilizers are given in three applications and on an average, contain 100-130 kg. nitrogen, 75-100 kg. P_2O_5 and 30-75 kg. of K_2O per hectare.

BRITISH GUIANA

Sugarcane is cultivated on the alluvial soils along the coast. Plant cane is harvested after about 12 months, as also the ratoon crops, usually 4 or 5. After the last ratoon crop, clean fallow is maintained; during this period the land is often flooded. The semi-aquatic plants which develop are dug into the soil when the land is being prepared for further planting. This practice increases the content in ammoniacal nitrogen and improves the texture of the soil. Sulphate of ammonia is commonly used and is applied at the rate of 225 kg. per hectare for plant cane and 350-450 kg. per hectare for ratoons. Phosphoric acid is only applied when the soil is deficient in this element. If the soil is acid, slag (600-700 kg. per ha.) is applied, and if alkaline or weakly acid, superphosphate (350 kg. per ha) is used. Peat soils are limed. Many planters also employ lime on other soils at every new planting, chiefly with a view to checking the progressive acidification of the soil.

HAWAII

Both plant cane and ratoons are only cut at the end of 18 to 20 months. Usually two or three ratoon crops are obtained, after which the field is immediately replanted without a fallow period or rotation crop. In Hawaii, the crops are heavily manured, complete fertilizers usually being adopted. The formulae employed differ considerably not only from one estate to another, but even according to the types of soil on the same estate. The quantities of fertilizer elements employed per hectare vary as follows: nitrogen, 225 kg.; phosphoric acid, 350 kg.; potash, 350 kg. Nitrogen is supplied in the form of nitrate of soda or potash, sulphate and phosphate of ammonia, urea and calcium cyanamid. At present there is a tendency to replace the nitrates by ammoniacal salts. For phosphoric acid, triple superphosphates are generally used; potash is utilized in the form of chloride and nitrate. Organic manures are seldom used at present. Press-cakes and molasses are usually turned into the soil; sometimes, small quantities of bone meal or dried blood are applied.

INDIA

Sugarcane is cultivated chiefly in the northern provinces. The cane is cut after 12 months, and in general, no ratoon crops are grown. Sugarcane is cultivated in rotation with food crops and sometimes with a legume which is later dug in as green manure.

The natives apply small quantities of cow dung and occasionally oil-cake in the furrow before planting. There is now a tendency to use mineral fertilizers, chiefly sulphate of ammonia and superphosphates.

JAVA

In Java, plant cane is the usual crop, harvested at 12 to 16 months. The fields are usually irrigated in the dry season. The mud deposited by the water used for flooding the rice-fields and watering the cane contains appreciable quantities of fertilizer elements. Consequently, the only fertilizer generally used is sulphate of ammonia. The average amounts applied vary from 5 to 6 quintals per hectare; 25 per cent. of the land under sugarcane is given phosphoric acid in the form of lime double superphosphate or ammonium phosphate (200 kg. per ha). Potash is only employed in exceptional cases. Sometimes on light soils, farm manure, oil-cake and molasses are applied substituting part of the ammonium sulphate; press-cake and bagasse ash are used for soils deficient in phosphoric acid.

MAURITIUS

According to locality, plant cane is left in the soil 13 to 15 months or 18 to 22 months. In general, 3 to 6 ratoon crops are grown. During fallow which lasts from one to three years, legumes are frequently grown. Legumes are often grown between the rows of the young cane and are uprooted and dug into the soil on flowering. The cane trash is usually dug into the soil or utilized for making compost. Pen manure is applied 4 to 5 months after planting; if 5 or 6 ratoon crops are grown, applications are also given to the third or fourth ratoons. Among the other organic fertilizers employed, mention may be made of sheep dung, 'normal fertilizer' (composed of human excrement and town sewage), press-cake and, in particular, molasses. The cane is also given nitrogen, phosphoric acid and potash. The nitrogenous fertilizers used are, in order of importance, sulphate of ammonia, nitrate of soda and nitrate of potash. The chief source of phosphoric acid is phosphatic guano from Seychelles. Potash is supplied by nitrate of soda imported from India; complete fertilizer concentrates are not used.

PERU

The cane is harvested at the end of 16 to 24 months and a fairly large number of ratoon crops are grown. The chief fertilizer utilized is Peruvian guano which generally contains 10-14 per cent. nitrogen, 9-12 per cent. phosphoric acid and 1-2 per cent. K_2O . It is considered that the quantity of nitrogen applied to plant cane should not exceed 110 kg. per hectare otherwise the juice purity and sucrose content will be reduced.

PUERTO RICO

Plant cane is harvested after 12 to 14 or 12 to 18 months. As a rule the ratoons are cropped at the end of 11 to 12 months; one or two ratoon crops are usually grown. After the last ratoon, the cane trash is usually burnt and the field immediately replanted. In sandy soils, the trash is sometimes dug in. Frequently in the southern part of the island, a green manure catch crop is grown. Little organic manure is available owing to the present general system of mechanical cultivation. Chemical fertilizers are the rule. The present tendency is to give plant cane 5 or 6 weeks after planting or occasionally at the time of planting, an application of 450 to 675 kg. of complete fertilizer per hectare, followed six or ten weeks later by a second application of 450 kg. of sulphate of ammonia and sometimes in commercial estates, a further application of 450 kg. of sulphate of ammonia two months later. Ratoons are given a preliminary application of 450 to 675 kg. complete fertilizer per ha. as soon as possible after cropping and, two months later, a second application of sulphate of ammonia (450 kg. per ha.).

REUNION

The usual system is a plant cane crop, harvested after 18 to 20 months, followed by 2 or 3 ratoon crops, in exceptional cases, 4 or 5. After the last ratoon, food crops and sometimes leguminous cover crops are grown. Owing to the limited number of live-stock, farm manure is seldom used. Manure is applied at the rate of 15 to 25 tons per hectare. The use of chemical fertilizers is general. The chief formulae adopted are sulphate of ammonia, calcium nitrate (local manufacture) and soda; lime superphosphate, dicalcium phosphate and phosphatic guano; sulphate and chloride of potash. Sometimes nitrogenous fertilizer only is given to the cane, but generally, complete fertilizers are employed.

TRINIDAD

Usually in Trinidad one plant cane crop is followed by three ratoon crops, after which the field is immediately replanted. Smallholders generally do not take manure and, in particular mineral fertilizers, into account. On the large estates, usually 25 to 35 tons of farm manure per hectare are given with a supplementary application of mineral fertilizer: sulphate of ammonia (550-700 kg. per ha.), frequently, sulphate of potash (125-250 kg.) and more rarely superphosphate (125 kg.). The amount and type of fertilizer to be applied is determined after making soil analyses and field experiments. Mineral fertilizer is usually given to plant cane in two applications: complete fertilizer during the first rainy season (2 to 3 months after planting) and sulphate of ammonia during the subsequent dry season. Ratoons are manured during the first month of the rainy season. If the soil is acid, lime, usually at the rate of 12 tons per hectare, is applied.

J. L.

New tendencies in rural construction in Germany.

With the aim of contributing to the measures taken in improving the living conditions of the German peasant, the Reich Ministry of Nutrition and Agriculture (Division VIII: Peasant settlement) has published a study on tendencies in construction, which may be summarized as follows.

All new, modified or enlarged constructions should comply with the increasing requirements of agriculture to-day and in the future.

The improvement and renovation of village constructions should be based on a peasant conception of farms and villages convenient and suitable to the position selected. The sound traditional methods of construction should be developed to meet present day requirements and conditions. The establishment of adequate and healthy housing is of the highest importance. To satisfy the housing requirements of the rural population, it should be taken as a basis that the house of a peasant family should comprise at least the following quarters:

- A living room (20-25 m² in area).
- A kitchen or kitchen-eating room (25-28 m²).
- A bedroom for the parents (20 m²).
- Two bedrooms for the children (each 14-18 m²).
- A room for harvest help or maid-servant (12 m²).
- A room for farm-hands (12 m²).
- Spacious hall (not less than 12 m²).
- Installation of bath or shower-bath in the house.
- Curing room (1.5-3 m²).
- Dining room or provision room.
- Cellars (6 m²).
- Room for cooling milk (3-6 m²).
- Closet and annexe.

The arrangement of the different rooms should be such that the management of the house is facilitated as much as possible. In particular, the greatest attention should be given to the kitchen or kitchen-eating room in order to lighten the task of the housewife.

Provision should be made to supply all farms and rural houses with water, means of heating and electric light, taking into consideration the experiments and suggestions made by the 'Reichskuratorium für Technik in der Landwirtschaft' (Government Board of Agricultural Engineering). Particular attention should be given to protecting the constructions from soil humidity, against heat and cold, and to obtaining good lighting and adequate ventilation.

Recent investigations have shown that many diseases of the rural population can be attributed to unhealthy housing conditions even in new constructions. The correct arrangement of the rooms from the hygienic viewpoint and their position is most important.

For the rural population to change to new constructions, the farm buildings will have to be irreproachable as regards working arrangements and hygiene. All premises for the storage of agricultural products should be constructed in such a way that losses are minimum.

In contrast to the old system, the new villages should not be built on both the left and right sides of the main highways, but either to the left or to the right and as far away as possible from the thoroughfare with which they can be connected by means of a sideroad. This is necessary to prevent traffic from interfering with village life and viceversa. In the future, all farms should be connected to well established access roads. The farms should be as far apart as possible in order to allow for expansion.

To facilitate fire control and protection, the farm buildings should not be placed close together and the farms should be connected with the fields by roads as short and direct as possible.

For the further development of the village from the beginning, lots should be set aside for the construction of houses. The communal buildings as well as the houses of the artisans and tradesmen should be grouped to form the central part of the village. Particular attention should also be given to trees, both in increasing their number and in maintaining them in good condition.

H. J. H.

Production of and trade in agricultural machinery in the United States in 1939.

It is generally affirmed that the production of agricultural machinery in the United States practically equals that of the rest of the world. In the last four years, average production, in round figures, represented an annual value of half a milliard dollars, with a maximum of 580 million dollars in 1937, against 490 million in 1938 and 473 million in 1939. In this year (1939), over 85 per cent. of the production was absorbed in the country itself, while the remaining 15 per cent. or so was exported.

Tractors show the highest figures — 43 per cent in 1939, followed by harvesters, amounting in that year to about 10 per cent. (See Table I).

Despite the war, exports of agricultural machinery from the United States in 1939 amounted to 68.5 million dollars, only slightly lower than the figure for 1938—75.4 million (Table II). This is due to the fact that in many overseas countries, European competition was eliminated, and also that many of these countries increased their outturn of food products on the outbreak of the war, hoping to increase exports. On the other hand, the war from the beginning has lost the United States several markets, particularly in Eastern Europe. On the whole, however, results were satisfactory in 1939.

In comparison with the first half-year of 1939, the first six months of 1940 show an increase in exports of agricultural machinery and implements which indicates that the markets obtained through the war in consequence of reduced competition exceed the markets lost. (Table III).

Whether the position will change or not it is impossible to say at present.

TABLE I. — *Production of agricultural machinery in the United States in 1938 and 1939.*

(in million dollars)

| Description | 1939 | 1938 |
|---|--------------|--------------|
| Tractors | 196.2 | 203.6 |
| Combustion engines | 15.4 | 18.7 |
| Ploughs and listers | 26.8 | 20.0 |
| Other tillage and cultivation implements | 50.4 | 38.4 |
| Haymaking machinery | 14.6 | 14.2 |
| Harvesters | 71.5 | 48.0 |
| Machinery for preparing crops | 22.6 | 19.5 |
| Farm wagons | 4.4 | 5.2 |
| Other agricultural machinery and implements | 88.1 | 105.5 |
| <i>Total</i> | <i>490.0</i> | <i>473.2</i> |

TABLE II. — *Exports of agricultural machinery from the United States in 1938 and 1939.*

(in million dollars)

| Country | Total exports in 1938 | Total exports in 1939 | Tractor exports in 1939 |
|---------------------------------|-----------------------|-----------------------|-------------------------|
| Canada | 20.7 | 21.1 | 14.9 |
| Argentina | 14.0 | 6.8 | 1.8 |
| Great Britain | 3.9 | 6.6 | 6.0 |
| Union of South Africa | 4.5 | 4.2 | 2.2 |
| Australia | 6.3 | 3.2 | 2.8 |
| Sweden | 2.3 | 3.2 | 2.8 |
| New Zealand | 3.2 | 2.0 | 1.6 |
| Mexico | 1.5 | 2.0 | 1.1 |
| Brazil | 1.5 | 1.6 | 1.2 |
| Algeria and Tunisia | 1.8 | 1.6 | 1.2 |
| France | 1.4 | 1.2 | 1.1 |
| Venezuela | 0.7 | 1.2 | 0.9 |
| Colombia | 0.8 | 1.1 | 0.9 |
| Other countries | 12.5 | 12.7 | 9.5 |
| <i>Total</i> | <i>75.4</i> | <i>68.5</i> | <i>48.0</i> |

TABLE III. — Exports of agricultural machinery from the United States in 1939 and 1940.

| Description | Quantity | | | Value in million dollars | | |
|---|-----------|--------------------|--------------------|--------------------------|--------------------|--------------------|
| | Year 1939 | 1st half-year 1939 | 1st half-year 1940 | Year 1939 | 1st half-year 1939 | 1st half-year 1940 |
| Windmills | 13,171 | 6,849 | 4,259 | 0.75 | 0.40 | 0.27 |
| Tractors | 37,549 | 19,462 | 27,258 | 47.99 | 24.98 | 32.05 |
| Ploughs | 61,631 | 29,989 | 31,529 | 2.14 | 1.05 | 1.57 |
| Other implements for tillage and cultivation work . . . | .. | .. | .. | 4.04 | 2.15 | 3.04 |
| Mowers | 4,767 | 2,586 | 2,877 | 0.36 | 0.18 | 0.21 |
| Grain harvesters | 2,687 | 541 | 723 | 0.63 | 0.13 | 0.15 |
| Harvester-threshers | 4,444 | 1,979 | 1,821 | 4.48 | 2.18 | 1.80 |
| Threshers | 776 | 126 | 261 | 0.70 | 0.10 | 0.33 |
| Dairy machinery | .. | .. | .. | 0.47 | 0.25 | 0.25 |
| Other agricultural machinery and implements | .. | .. | .. | 6.95 | 3.49 | 3.78 |
| Total | .. | .. | .. | 68.51 | 34.91 | 43.45 |

H. g. H.

Machine for separating seed from not easily removable impurities.

The inventors RYXIN, OLOINSKY, PROTUSEVITCH and BALABAROV have constructed an electric apparatus which eliminates the impurities usually difficult to remove from seed. Experiments have shown that this apparatus is highly successful in removing *Rumex acetosella* from *Phleum pratense* L. and cornflower (*Centaurea cyanus*) from flax. It is also said to be possible to separate lucerne from *Picris hieracioides* L., oats from wild oats (*Avena fatua* L.), rye from *Claviceps*, etc.

The principle of this electric separator is as follows; the seed passing through an electric discharge at high tension attains a high positive charge. Because of specific properties, the seed of the various weeds attain a higher charge and are drawn through a series of revolving cylinders from which they are removed by means of a special brush arrangement.

The tension required is from 30,000-70,000 volts, with a current density of 1/1000 ampere. Twenty separators can be run on one transformer; the outturn of cleaned seed amounts to 20 tons per day.

G. S.

Elimination of diseased milch cows in Switzerland.

With a view to improving the quality of milk and milk products, an Ordinance of the Swiss Federal Department of Public Economy requires all dairy farmers to eliminate from their herds the cows which give defective milk. In general, the cows to be eliminated are those suffering from an incurable disease and, in particular, from mammary tuberculosis, contagious streptococcic mastitis, or other chronic and incurable diseases which may contaminate the milk. The milk control associations will report to the inspector for cheese-dairies and herds all changes encountered in the milk which suggest the presence of the aforesaid diseases. The inspector will then examine

the herd of the farm in question and take samples of the milk. The cows shown to be diseased by analyses of these samples are reported to the Cantonal Veterinary Surgeon. If veterinary examination shows the possibility of recovery, the owner has to decide within ten days whether he wishes the animal to be treated or eliminated; during the period of veterinary treatment, the animal may only be sold for slaughter. Cows suffering from mammary tuberculosis or which excrete tuberculosis bacilli in the milk should be slaughtered immediately. All other animals marked as diseased, must, within the 30 days which follow marking, either be slaughtered or no longer bred. The proprietor of the animal is obliged to prove slaughter by presenting an official attestation to the cantonal veterinary surgeon. I. M.

A wax from hemp.

L. MONTI, of the Rome University, has begun a series of experiments with a view to isolating and identifying a waxy substance extracted from the debris left after hemp beating or stripping. About 11 per cent. of wax which is suitable for various uses can be extracted.

The crude wax appears as a solid mass, brown, brittle, with granulous fracture, and specific weight at 15°C. of 1.001-1.003. These physical characteristics are very similar to those of ordinary waxes.

The chemical composition of this product—like that of all natural waxes—is very complex, and as yet experiments have not gone beyond the preliminary stage.

This wax which resembles alcohols in behaviour, looks like light and very bulky sawdust, unctuous to the touch, and has an unpleasant odour, especially if obtained from retted hemp. On calcination, the ash residue amounts to 8.5 per cent., no volatile substances are evolved when passed through steam.

On treatment with ether, trichlorethylene (trieline) and benzene, a waxy product is obtained, greenish-yellow brown in colour, while with petroleum ether, a dirty-white substance, with melting point at 78-80°C. results.

From 100 g. of raw material treated in a Soxhlet apparatus with different solvents have been extracted: with ethyl ether—6.21 g. of wax; with trieline—10.88 g.; with benzene—10.87 g.; and with petroleum ether—2.75 g.

The melting point of the wax obtained with trieline is 68-78°C. and the amount of acidity 20.

This wax, which can be extracted from innumerable by-products, could, especially at present, find some practical application. G. S.

BOOK NOTICES *

ROEMER, Th. and RUDOLF, W., *Handbuch der Pflanzenzüchtung*. II. Band, Berlin, Paul Parey, 1939-1940.

Attention has already been called twice (*B.* 1938, No. 11 and *B.* 12, 1939) to this comprehensive manual on plant improvement. Now that 15 of the 20 contemplated booklets have been published, it is not out of place to again review this monumental work which, fortunately, is being continued despite the present difficult circumstances.

The 2nd volume is now practically complete, as well as the essential parts of the four other volumes. The second volume deals with cereal selection, thus treating on one of the most important groups of plants in world agriculture.

* Reviews of books presented to the Library appear under this heading.

The section on the selection of different cereals is preceded by a review by Th. ROEMER of the basic principles of this work which eliminates repetition in the different chapters which follow, and gives to the whole a uniform character to which the two authors of this work pay particular attention in view of the many collaborators.

Despite the strict scientific accuracy, the author, in discussing the results of experimental and research work, never loses sight of the practical application by which the plant breeder may profit. Correlations being of little value in plant breeding, are treated briefly. As regards field experiments and testing of varieties, their value is estimated after comparison with laboratory experiments. Particularly for estimating resistance to winter cold and to drought in which case, study of the different factors is of little value and as laboratory trials only give a partial survey of the problems, field experiments still maintain their predominant position despite all innovations in laboratory technique.

The more difficult the present day advanced technique of plant breeding makes further progress, the greater also becomes the value of the technique of field selection, which makes it possible to recognize and retain definitely hereditary variations. The chapter *Zuchtgarten Technik* (Field selection technique) by Mr ROEMER, a practical and experienced plant breeder, is, therefore, of particular importance, and the only regret is that it is not longer.

Mr ROEMER also treats on the selection of rye, where obligatory cross-pollination is of special significance. Here many problems arise which afterwards acquire particular importance when treating on maize selection. The different aims of rye selection are indicated in detail. The selection of perennial grain rye which has recently been the subject of considerable unmerited discussion in agricultural literature, is brought back to its position of importance limited exclusively to regions of extensive cultivation. As transmitter of the character of perenniality, *Secale montanum* of the Caucasus is of little value, while the author considers *S. clausopetalum* of Turkestan as a good parent plant owing to its remarkable resistance to shattering.

The chapter on maize selection is by Mr TAVCAR (Systematics, cytology, genetics) and Mr LIEBER (Aims of selection, its technique and organization). The peculiarities of maize selection are clearly discussed. Of particular importance the information on the American process of artificial self-fertilization with subsequent production of hybrids, a process which as yet is little known in Europe.

The chapter on barley is also the work of two authors. Karl ISENBECK studies the general problems of selection, the question of resistance to diseases and the selection of brewers' barley. W. HOFFMANN deals with systematics and genetics, physiological resistance, selection of forage barley. In conclusion, K. ISENBECK describes the characters required for registration of varieties. This question so important for the protection of varieties, is also treated by other authors at the end of each chapter on the different cereals.

W. NICOLAISEN who has an extensive knowledge acquired over many years of practical plant breeding, closes this volume with a detailed discussion of the scientific fundamentals and problems of oats selection and its practical application.

N. v. G.

IMPERIAL BUREAU OF PLANT BREEDING AND GENETICS. *Field trials, their layout and statistical analysis*. Cambridge, School of Agriculture, 1940, 36 pp.

The series of publications issued by the Imperial Agricultural Bureaux need no introduction but attention should be drawn to the latest of the series. To the experienced experimenter who has made a study of the design of field experiments this book offers nothing new but, whilst it does not claim to make any fresh contribution to the science of statistical mathematics, it does fill a long felt need for a handy guide to the design of field experiments.

The majority of biologists have not usually the necessary mathematical training to be able to plan their work to the best advantage from a statistical point of view and, as it may not always be possible to obtain the services of a statistician to do it for them, this work does have a real value to research workers, particularly those dealing with variety and manurial trials.

Practically without exception other books on the same subject have either been too comprehensive for any one type of experiment and consequently too long and expensive or, aiming at brevity, they are too abstruse and confined to principles which makes them of value only to persons making a study of this branch of mathematics.

Professor WISHART avoids both these errors by indicating the exact scope of his booklet in the title and confining his subject matter to the important aspects of experiment design and the calculation of results. Simple trials and multiple factor experiments are discussed and devices for preventing the latter from becoming too cumbersome, and the lay-outs in common use are described, (randomised blocks, the Latin square and its variations, split plots and other devices for multiple variants such as confounding).

A striking example of the value of seemingly unimportant details in planning is given on page 10 where it is shown that an experiment which is duplicated in 2 blocks gives a significance to the same experimental data, different from that calculated on the basis of duplicate experiments within one block; the neglect of the information that the tests were associated in pairs being responsible for an important reduction in the significance of an observed difference.

Any one who has been confronted with the difficulties of field experiments and has experienced the annoyance of finding, too late, that a slight modification in the position of the experimental plots would have opened up the possibility of more accurate comparison without adding anything to the amount of experimental work, will at once see the boon that this booklet of Prof. WISHART will be to geneticists and others.

J. C. H.

ONOFRY, A., *La canna commune (Arundo donax L.)*. Roma, Cremonese Librai Editore, 1940, 166 pp., 77 illustr.

This work illustrated with photographs and well executed drawings, fills a lacuna by condensing and completing the scattered information on the great reed or donax reed (*Arundo donax L.*) which present circumstances have brought to the fore and which tends to become an industrial crop of importance for cellulose production. In the first part, the author studies the plant from the botanical, structural and statistical viewpoint; in the second, he discusses the question from the agricultural aspect. After having reviewed the state of cultivation in different regions of Italy, the author gives a concise description of the way in which the rhizome develops and the plant multiplies, the influence of climatic conditions, soil and its preparation, manuring, planting, cultivation care, rejuvenation, harvesting, pests and diseases. A brief bibliography is appended. The author, however, does not restrict himself to the usual methods employed. He describes his own method (Onofry method) based on the mode of development of the rhizome, of establishing cane-fields in which the rows of reed or cane are alternated with open rows planted, for example, with a leguminous forage or green manure crop. The rhizomes spread towards the adjoining rows orientated towards the south and the new plants come up on fresh ground; the exhausted row to the north is cleared periodically and allowed to rest for a certain period before again being reached by the extending rhizomes from the neighbouring rows. The Onofry method aims chiefly at maintaining regularity in yield, indispensable for industrial production. Stand density may exceed 100 canes per m² and the life of the cane-fields is practically unlimited.

This book is very clearly and concisely written and the excellent photographs and diagrams add to its comprehensiveness.

A. H.

DI RICCO, G., *Le irrigazioni nei riguardi tecnico-costruttivi*. Prima parte dell'ottavo volume della "Biblioteca della Bonifica Integrale" Firenze, S. A. Editore Barbèra, 1940, 326 pp., 143 figs.

The practice of land irrigation has given outstanding results in Italy. Thanks to a tradition handed down from the most remote times, this important agricultural practice has been progressively developed and improved from the Middle Ages up to the present day. It cannot be affirmed, however, that full use of all the surface and subterranean water stocks of this country is now being made; a complementary supply of irrigation water, in fact, could be obtained by regulating the Italian Alpine lakes and reducing waste by improving the existing irrigation works; these problems are already under study.

The extension of irrigation to regions recently reclaimed from the hydraulic viewpoint, has given a fresh stimulus to the construction of large scale irrigation works; this activity is in full swing and is encouraged by the Government by moral and financial assistance.

This volume treats on the principal questions regarding the practice of irrigation, both in the study and execution of an irrigation project and in its utilization. The different points are clearly and concisely discussed, limiting technical explanations but going into greater detail on the construction of irrigation works and their utilization.

The book opens with general information and explains the course to be followed in the study of an irrigation project. After a brief examination of the quality of the waters varying with their source and function, the author presents some views of a hydrological character on the evaluation of the quantity of water available and its possibilities in regard to the size of the district to be irrigated. A chapter deals with the methods to be followed in collecting and conveying the waters of different sources, while others treat on the technical and economic questions regarding irrigation conduits in general and enable the designer of a project to choose the solution most suitable for his purpose, from those offered.

After a rapid review of the general characteristics of the system of adduction, distribution and utilization, the author describes the methods usually employed for the measurement, regulation and distribution of water among the different users of the same irrigation scheme, and also the system preferred in Italy for supplying water to users.

Then follow a rapid description of the different systems followed in watering crops, indicating the conditions to be observed in each case; some information on the preparation of the land to make it irrigable, although deliberately excluding all data of an agricultural character which are given in the second part of the volume. The volume concludes with some brief indications on the use of sewage.

H. J. H.

NAVES, Y. R. & MAZUYER. *Les parfumes naturels, essences concrètes, résinoïdes, huiles et pomades*. Paris, Gauthier-Villars, 1939, 398 pp., 8 plates. Price: 120 francs.

There are many manuals on the technique employed to-day in the perfume industry; among them the work of NAVES & MAZUYER is of particular importance.

The first section comprises a documented history of the methods and solvents employed in the course of centuries. The methods of extracting odoriferous substances have, in the course of time, been modified and improved but are still used to-day in some form or other. Besides the industrial methods, the practices of antiquity or the Middle Ages are still used for present day treatment of plants.

The method most commonly utilized to isolate natural odorous substances is by steam distillation (essential oils or essences). This system, however, has certain defects which do not occur when using methods of digestion, enfleurage, and of extraction by volatile substances, including alcohol; the products obtained reproduce the odour of the plant substance to a truer degree than the essential oil.

In the second section, the authors describe the raw material submitted to extraction; the selection, purification and recovery of volatile solvents; the preparation of tinctures, infusions and the treatment of solid essences of resins and balsams; the extraction of fruit aromas and flower distillates; the manufacture of pomades and perfumed oils using vegetal and animal fats or mineral oils (digestion and enfleurage on solid and liquid absorbents); and lastly, the extraction, from diffused products and solid essences, of absolutes and concentrates of pomades, decolorized.

In the third section, data are given on the chemical composition and analytical examination of the products extracted by volatile solvents, enfleurage and digestion.

The fourth and concluding section, of particular importance, combines a series of treatises on the vegetal or animal raw material used.

In view of the importance of the documentation assembled, the choice and wide variety in the subject-matter treated, this work will be profitably read by everyone interested in the perfume industry and the art of perfumery, both from the scientific and the industrial viewpoint.

E. G.

TOTMAN, C. C., MCKAY, G. L. & LARSEN, Ch., *Butter*. New York, John Wiley & Sons Inc., 1939, 472 pp., 134 fig. Price: \$ 3.50.

This book on butter is a revision of *Principles and Practice of Buttermaking* made with the idea of providing a textbook for undergraduate instruction and also of furnishing useful information to plant operators and others connected with or interested

in buttermaking. This new edition has been entirely rewritten except for part of Chapter 3, 'Milk and its Products as Foods,' and the entire Chapter 4, 'Variation of fat in Milk and Cream'. Three phases of the butter industry are treated more fully, these are: (a) buying and grading of cream; (b) churning, working of butter and composition control; and (c) marketing.

This book contains considerable information presented in graphical form, which facilitates instruction and retention of the facts presented. The AA. have limited themselves to the outlines of the subject and have not attempted to make a detailed study of the various aspects of butter-making; the publications supplying full information on any particular point are indicated.

Careful attention has been given to ensuring the accuracy and clarity of the charts and statistics included in this useful manual.

E. G.

GRÜNWOLDT, Franz, *Die Dokumentation in der Forstwirtschaft*. Neudamm u. Berlin, Verlag J. Neumann, 1940. 87 pp. (Zeitschrift für Weltforstwirtschaft. Journal of World Forestry. Revue Economique Forestière Universelle. Beiheft zum Band VII).

Forestry is one of those fields of knowledge, in which, within the last four decades, an active international collaboration of scientific character has been put into effect through the efforts of the 'International Union of Forest Research Organizations'. Forestry experts have long recognized the importance of an international forestry bibliography. Mention may be made of Ph. Flury, the author of an excellent classification scheme for forestry, and of A. Oppermann, who compiled the 'Bibliographia universalis silviculturalae'. The recent establishment of the International Forestry Centre (C. I. S.) in Berlin offers a good occasion for reconsidering the whole problem of silvicultural documentation and, it is most fortunate, therefore, that the librarian of this new organization has prepared at the very start of its activity an extremely thorough and complete study of the various aspects concerned. The A. discusses not only the problems of international bibliographies and classification, but also the problems dealing with the collection, classification and valorization of forestry documentation in the widest sense of the word. He goes considerably beyond the range of library activity in the usual sense and invades the domain of documentation proper, treating on bibliographies, reference and information service, archival material and international loans, to mention only a few problems. Grünwoldt's proposals with regard to the rational organization of forestry documentation on international lines correspond largely to the programme regarding agricultural documentation established by the International Institute of Agriculture and the International Committee of Agricultural Librarians. Obviously, the creation of a large central forestry library of international character and of an equally comprehensive centre of documentation is the primary condition for international collaboration in scientific forestry work.

Besides the chapters dealing with questions of principle and the programme of future work, the book has the further important merit of providing the forestry expert and librarian with very complete information on the bibliographical and library tools which exist in the field of forestry and which ought to be known. An example is the possibly not complete but still very useful list of those sources which have to be considered in collecting and acquiring forestry literature. Moreover the book contains a list of the forestry libraries of the world which may be compared with the International Directory of Agricultural Libraries, published by the International Institute of Agriculture (1939). The A. has added to the forestry libraries mentioned in the Institute's list (66), a further 26, or if the Soviet Union, which for technical reasons had to be omitted from the Institute's list, is included, still another 15 libraries. Also useful is the compilation of printed catalogues and periodical accession lists of forestry libraries. A most valuable feature from the agricultural viewpoint is the very comprehensive and well arranged list of national and international forestry bibliographies, including not only current bibliographies but also bibliographical monographs concerning older literature as well as special bibliographies entirely on the various branches of forestry.

S. v. F.

NEW PERIODICALS RECEIVED BY THE LIBRARY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

for the fourth quarter of 1940 (*).

- R. Accademia d'Italia. Atti della Reale Accademia d'Italia. Rendiconti della Classe di scienze fisiche, matematiche e naturali. Roma, 7° s. v. 1 (1939-40)-, irr. (12 fasc. p. v.). [Cumulating: Atti della Reale Accademia nazionale dei Lincei. Rendiconti. Classe di scienze fisiche, matematiche e naturali. 6° Série].
- ALBERTA. University. College of agriculture. Bulletin. Edmonton, no. 8 (1934)-, irr.
- ALBERTA. University. College of agriculture. Circular. Edmonton, no. 4 (1932)-, irr.
- ANNALI di microbiologia; raccolta di memorie di microbiologia generale ed applicata all'agricoltura, alle industrie fermentative ed alimentari: ...organo della Stazione sperimentale di batteriologia agraria di Crema. Milano, v. 1 (1940)-, irr. L. 50 int.; L. 100 étr. [Text of articles and summaries in German, English, French or Italian].
- ARQUIVOS do Serviço florestal. Ministerio da agricultura. Rio de Janeiro, v. 1 (1939)-, irr. [Formerly: Arquivos do Instituto de biologia vegetal].
- Bari. R. Università. Facoltà di giurisprudenza. Annali della Facoltà di giurisprudenza (già Annali del Seminario giuridico-economico). Bari, n. s. v. 1 (1938)-, irr.
- BOLLETTINO dei brevetti per invenzioni, modelli e marchi. Roma, n. 9/10 (1940)-, bimens. L. 36 int.; L. 80 étr. (Ministero delle corporazioni. Ufficio centrale dei brevetti per invenzioni, modelli e marchi). [Formerly: Bollettino della proprietà intellettuale].
- BOLLETTINO delle Assemblee legislative... Pubblicazione a cura del Senato del Regno e della Camera dei fasci e delle corporazioni. Roma, 2/2 s. v. 13 (1939)-, sem. [Formerly: Bollettino parlamentare].
- BOLLETTINO delle biblioteche delle Assemblee legislative. Nuove accessioni e spoglio delle riviste... Pubblicazione a cura del Senato del Regno e della Camera dei fasci e delle corporazioni. Roma, n. 1/2 (1939)-, sem. [Formerly: Bollettino parlamentare. Supplemento bibliografico].
- CARACAS. Instituto nacional del cafe. Revista del Instituto nacional del cafe. Caracas, v. 1 (1939)-, irr.
- CARIBBEAN forester. Tropical forest experiment station. Rio Piedras, Puerto Rico, [Southern forest experiment station]. [New Orleans, La.], v. 1 (1939/40)-, trim. [Mimeographed].
- COLOMBIE BRITANNIQUE. Department of agriculture. Field crop circular. [Victoria], no. 12 (1935)-, irr.
- DEUTSCHER Obstbau; Möllers deutsche Gärtnerzeitung. Frankfurt/Oder, Gartenbauverlag Trowitzsch & Sohn, v. 55 (1940)-, mens. RM. 9.- [Supplements annexed: «Sortenkunde im Obstbau» and «Pomologisches Zentral-Blatt»]. [Formerly: «Möllers deutsche Gärtnerzeitung»].
- GUATEMALA. Biblioteca nacional. Boletín de la Biblioteca nacional. Guatemala, v. 8 (1939)-, trim.

(*) List of abbreviations: biheb. (biweekly); bimens. (twice monthly); bimestr. (every two months) déc. (every ten days); étr. (foreign price); fasc. (copy); heb. (weekly); int. (home price); irr. (irregular) mens. (monthly); n° (number); N. S. (new series); p. a. (per annum); q. (daily); sem. (half yearly); s. (series); triheb. (every three weeks); v. (volume); trim. (quarterly).

N. B. — Between brackets [/] are given translations and explanatory notes not appearing in the title of the review.

- ITALIA centrale viti-vinicola. Arezzo, v. 1 (1937)-, bimestr. L. 10.- (Bolettino dell'Istituto enologico della Toscana. Arezzo). [Formerly: Bollettino enologico toscano. R. Cantina sperimentale e Laboratorio enochimico di Arezzo].
- LÉCHE; revista mensual editada por la Conaprole. Montevideo, [Cooperativa nacional de productores de leche], v. 1 (1937)-, mens. \$ 2.-
- MAGYAR állattenyésztés; az országos törzskönyvelő bizottság irányítása alatt álló állattenyésztő és törzskönyvelő szervezetek hivatalos lapja. Budapest, v. 1 (1939)-, bimens. [Hungarian animal breeding; official organ of Animal breeding and pedigree records organisations under direction of the National committee of the pedigree records]. [Formerly: Állattenyésztők lapja. (Review of animal breeders)].
- MEDELLÍN. [Universidad nacional]. Facultad nacional de agronomía. Revista. v. 1 (1939)-, irr.
- MIDLAND agricultural college. Sutton Bonington, Loughborough. Bulletin. No. 6 (1926)-, irr.
- PRODUSENTEN; medlemsblad for Norske melkeprodusenters landsforbund og Norges kjøtt-fleskesentral. Oslo, no. 1 (1940)-, irr. [Producer]. [Formerly Melkeprodusenten. (Milk producer)].
- REFRIGERATING engineering; economic application of air conditioning and refrigeration; ...official publication of The American Society of refrigerating engineers. New York, v. 40 (1940)-, mens. \$ 3.00 int.; \$ 4.00 étr.
- REVIEW of United States patents relating to pest control. Washington, D. C., v. 10 (1937)-, mens. (United States Department of Agriculture. Bureau of Entomology and Plant Quarantine. Division of insecticide investigations). [Mimeographed].
- RIVISTA geografica italiana. ...e Bollettino della « Società di studi geografici » residente in Firenze. Firenze, v. 44 (1937)-, 6 fasc. p. a. L. 30 - int.; L. 35.- étr. [Containing summaries also in German].
- TERRA trentina; periodico mensile delle istituzioni agrarie della provincia di Trento. Trento, v. 49 (1936)-, L. 6.- [Formerly: « Bollettino agrario; organo della Cattedra ambulante d'agricoltura di Trento, dell'Istituto agrario di San Michele e delle Aziende del Consiglio provinciale dell'economia »].
- UNITED STATES Government publications; monthly catalog issued by the Superintendent of documents. Washington, D. C., no. 541 (1940)-, mens. \$ 1.50 int.; \$ 2.10 étr. [Formerly: Monthly catalog U. S. public documents].
- VEORORDNUNGSBLATT für die besetzten norwegischen Gebiete. [Der Reichskommissar für die besetzten norwegischen Gebiete], Oslo, 1940-, irr. [Second title in Norwegian: Forordningstidend for de besatte norske områder]. [Bilingual text: German and Norwegian].
- ZEITSCHRIFT für Vitaminforschung; Zugleich Zentralblatt für Vitaminologie und verwandte Ernährungsprobleme. Bern, Verlag Hans Huber, v. 8 (1938/39)-, irr. Fr. s. 18.- ou RM 10.80 p. v. [Text of articles in German, English, French or Italian].

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*



PLANT PROTECTION

PLANT PROTECTION

INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

ITALIAN EAST AFRICA.

Insects and Other Crop Pests in 1939 †

The insects and other pests reported or personally observed by myself as causing damage to crops in Italian East Africa during 1939 are:—

INSECTS.

Isoptera.

(1) Various species of Termites with epigeous and hypogeous nests causing damage to the potato, cotton, *Cajanus indicus*, the doum palm, sugarcane, gum-miferous acacias and the supports of many buildings were noted in some territories of Italian East Africa.

Orthoptera - Acridioidea.

(2) Migrations of *Locusta migratoria migratorioides* (Rch. et Frm.) continued from one territory to another in the Empire, often with egg-laying. Wheat, barley, durra, maize, sugar sorghum, sugar cane, and many grasses on natural pasturages suffered the most damage. Leguminosae and plants of other families were always left untouched. Towards the end of the year, intensity of infestation declined appreciably in nearly all the territories.

(3) *Schistocerca gregaria* (Forsk.). Various foci showing a permanent or endemic development of the ph. *solitaria* of this species were observed throughout the low-lying eastern plain of Eritrea, from Massaua to the Sudanese border. There does not appear to be any immediate probability of the appearance of swarms of the ph. *gregaria*.

(4) *Phymateus* spp. Harmful in the larval, nymphal and adult stages to *Calotropis procera* and *Balanites aegyptiaca* and to crops of 'dagussà' (*Eleusine coracana*), durra and maize in different zones of Eritrea and other territories of the Empire.

* Under this and the next heading the countries are arranged in French alphabetical order.

† Communication from Dr. GIUSEPPE JANNONE, Section of Entomology and Agricultural Zoology, Centre of Agricultural and Zootechnical Research for Italian East Africa, Addis Ababa, transmitted to the Institute by the Ministry for Italian Africa, Rome.

(5) *Anacridium melanorhodon* Walk. Caused slight damage to durra and cotton crops at Tessenei in the western low-lying plain of Eritrea.

(6) *Pyrgomorphinae*. Larvae and nymphae of a species of this sub-family caused damage to *C. procera* in various zones of I. E. A.

(7) *Ornithacris* sp. Larvae, nymphae and adults harmful to ornamental and wild acacia trees, oleanders, *Phoenix canariensis*, cotton, etc.

Thysanoptera.

(8) *Selenothrips (Heliothrips) indicus* Bagn. Severe damage to cotton only in a few parts of the comprensorium of the S. I. A. at Tessenei in the western low-lying plain of Eritrea.

Hemiptera.

Heteroptera.

(9) *Nezara viridula* (L.). (*Pentatomidae*) and

(10) *N. viridula* (L.) var. *torquata*.

In the larval, nymphal and adult stages, very harmful to crops of 'bultuc' (*Pennisetum typhoideum*) in the northern area of the eastern low-lying plain of Eritrea. They suck the grain on the spike and cause aborted seed.

(11) *Antestia lineaticollis* Stål. (*Pentatomidae*). Reported as causing damage in the coffee plantations of Harar.

(12) *Codophila maculicollis* Dall. (*Pentatomidae*)

(13) *Nariscus cinctiventris* Germ. (*Coreidae*) and

(14) *Lygaeus amoenus* Bol. (*Lygaeidae*).

Found causing damage to various plants of the wild flora of southern Scioa.

(15) *Dysdercus cardinalis* Gerst. (*Pyrrhocoridae*) and

(16) *Dysdercus* sp.

Slight damage to cotton, baobab fruits and bolls of different wild Malvaceae in Eritrea, in Somaliland and in other territories.

Homoptera.

(17) *Kolla* sp. (*Cicadellidae*). Harmful to the leaves of wild solanaceous plants.

(18) *Empoasca facialis* Jac. (*Cicadellidae*). Considered to have damaged castor oil plants at Genale, Somaliland.

(19) *Spanioza erythrae* (Del Guercio) Boselli. (*Psyllidae*). Damaging in the larval and nymphal stages the young leaves and shoots of nearly all the citrus species cultivated, and particularly *Citrus limonum* Risso.

(20) *Bemisia tabaci* Gennad. (*Aleyrodidae*). Found on cotton plants at Tessenei in the western low-lying plain of Eritrea, but causing little or no damage. No leaf curl was noted.

(21) *Brachycolus brassicae* (L.). (*Aphididae*). Harmful to cultivated cabbages.

(22) *Toxoptera aurantii* (B. d. F.). (Aphididae). Found on the shoots and buds of citrus plants in various zones of I. E. A.

(23) *Rhopalosiphon maidis* (Fitch.). (Aphididae) and

(24) *Macrosiphon solanifolii* Ashmead. (Aphididae).

These Aphids were found causing damage to different wild species of Gramineae and Solanaceae in Scioa.

(25) *Macrosiphon rosae* (L.). (Aphididae). Found on the shoots and unopened flower buds of cultivated rose plants in many parts of I. E. A.

(26) *Chrysomphalus dictyospermi* (Morg.). (Coccidae).

(27) *Aspidiotus hederæ* (Vallot). (Coccidae).

(28) *Parlatoria (Websteriella) zizyphus* (Lucas). (Coccidae).

(29) *Pericerya purchasi* (Maskell) Silv. (Coccidae).

(30) *Mytilococcus beekii* (Newman). (Coccidae) and

(31) *Coccus hesperidum* L. or a variety of this species. (Coccidae).

Scale insects causing damage and in some cases severe damage to citrus in Eritrea, Scioa and Harar and in other localities of the Empire. However all these six species are not always present together in the citrus-growing areas.

(32) *Aspidiotus destructor* Signoret (= *A. trasparens*). (Coccidae). Reported as damaging banana groves at Genale, Somaliland.

Lepidoptera.

(33) *Ocinara ficicola* Strd. (Bombycidae). Species harmful in the larval stage to the leaves of *Ficus dekdena* and *F. elastica* in Eritrea.

(34) *Pericallia geometrica* Oberth. (Arctiidae). Very harmful in the larval stage to the leaves of castor oil plants cultivated in Scioa and Eritrea.

(35) *Drepanoptera antinorii* Oberth. (= *Epiphora antinorii* Oberth.). (Saturniidae). Fairly harmful to the leaves of castor oil plants in Scioa and Eritrea.

(36) *Acraea encedon necoda* Hew. (Nymphalidae). Caused severe damage to plants of *Urtica simensis*, *Malva verticillata* and *Cirsium lanceolatum abyssinicum* in the close vicinity of Addis Abeba.

(37) *Pieris brassicoides* Guér. (Pieridae). Very harmful to *Tropaeolum majus*, to cultivated cabbages and different wild cruciferous plants in Addis Abeba and its vicinity.

(38) *Plutella maculipennis* Curt. (Plutellidae). Caused severe damage in a few sporadic cases to the leaves of *Tr. majus* in Scioa.

(39) *Cossus* or a related genus (Cossidae). One species caused very severe damage to the stems and the principal and secondary branches of the castor oil plant (plants 2-3 years old) in southern Scioa.

(40) *Holocera smilax* Angas. (Saturniidae). Caused severe leaf scorch on *Schinus molle* in Eritrea (Asmara and environs).

(41) *Dasychira extorta* Dist. (Lymantriidae). Harmful to the leaves of many wild *Ficus* in Eritrea and Harar (Arussi).

(42) *Papilio demodocus* Esp. (Papilionidae). Found in nearly all the citrus orchards of the Empire, but not causing much damage.

(43) *Chloridea armigera* Hb. (= *Ch. obsoleta* Hb.). (*Noctuidae*). Harmful, though only slightly, to maize and durra crops in Eritrea.

(44) Another species of *Noctuidae* caused severe damage to experimental crops of tobacco in southern Scioa; the caterpillars eat the leaves.

(45) *Plodia interpunctella* Hb. (*Pyalidae*) and

(46) *Ephestia kuehniella* Zeller. (*Pyalidae*).

These two Microlepidoptera severely damaged a large consignment of wheat sent from Europe and stored at Asmara, Eritrea.

(47) *Platyedra gossypiella* Saund. (= *Gelechia gossypiella* Saund.). (*Gelechiidae*). Fairly harmful to cotton crops in Genale and Alessandria, Somaliland. Not found in the cotton district of Tessenei in the western low-lying plain of Eritrea.

(48) *Sesamia cretica* Led. (*Noctuidae*). Caused much damage to maize crops in Genale, Jonte and Alessandra, Somaliland.

(49) *Busseola fusca* Full. (*Noctuidae*). Found on maize and sorghums in southern Scioa, but causing little damage and always less than in 1938.

(50) *Laphygma exigua* Hb. (*Noctuidae*) and

(51) *Spilosoma investigatorum* Karsch. (*Arctiidae*).

Very numerous caterpillars of these two species appeared in some zones of Harar, causing the total destruction of the durra and maize crops and severe damage to the natural pasture lands.

(52) *Leucoptera coffeella* (Guér.-Mén.). (*Lyonetiidae*). Caused heavy losses in the coffee plantations in Amara (Zeghiè Peninsula, on Lake Tana) and in Scioa ('Villa Anna Maria' area).

Coleoptera.

(53) *Pachnoda (Cetonia) interrupta* L. (*Scarabacidae, Cetoniinae*). Fairly serious infestation of durra on the slopes along the western low-lying plain of Eritrea (territory of the Barentù Residency).

(54) *Epilachna similis* Thunb. (*Coccinellidae*). Heavy infestation of the larvae and adults of this species in southern Scioa and to a small extent also in Eritrea, damaging wheat, barley, maize, durra and sorghum crops in general.

(55) *Calandra granaria* (L.). (*Curculionidae*).

(56) *Tenebrioides mauritanicus* L. (*Tenebrionidae*) and

(57) *Tribolium confusum* Duval. (*Tenebrionidae*).

These three beetles caused severe damage to a consignment of wheat obtained from Europe and stored at Asmara, Eritrea.

(58) *Nisotra uniformis* Jac. (*Halticidae*). A species found very frequently on cotton crops in Tessenei, in the western low-lying plain of Eritrea, but not very harmful.

(59) *Tanymecus* n. sp. (*Curculionidae*). This species, identified by Sir Guy A. K. Marshall, Director of the Imperial Institute of Entomology, London, has caused considerable damage to crops of maize and sugar sorghum in Bolè, Addis Abeba.

(60) *Megalognatha aenea* Laboiss. (Galerucidae). Very harmful in the adult stage to peach and almond trees in some localities near Addis Abeba.

(61) *Mylabris flavoguttata* Rch. (Meloidae) and

(62) *Myl. haccolyssa* Racheb. (Meloidae).

Beetles causing very heavy damage to potato, alfalfa and bean crops and to many wild solanaceous plants in central and southern Scioa.

(63) *Chilocorus distigma* Klug. (Coccinellidae).

(64) *Exochomus cherenensis* Weis. (Coccinellidae).

(65) *Rodolia* sp. probably *ferruginea* Weis. (Coccinellidae) and

(66) *Rodolia*? *argodi* Sicard. (Coccinellidae).

These four beetles have been found useful in Eritrea, in some cases having considerably reduced the number of many scale insects.

Diptera.

(67) *Ceratitis capitata* Wied. (Trypanecidae). Has caused much damage to sweet orange and mandarin fruits in various orchards in Eritrea.

(68) *Dacus brevistylus* Bezzi. (Trypanecidae). This species causes remarkably heavy damage to small marrows, cucumbers, watermelons and other vegetable crops in I. E. A. During 1939, losses were reported in Scioa, Eritrea, in Amara and in Harar.

(69) *Hylemyia flavibasis* Stein. (Muscidae) and

(70) *Paralima nidor* Cress. (Ephydriidae).

These two Diptera have caused severe damage to experimental crops of barley at Bolè, Addis Abeba and at Olettà, western Scioa. Their biology differs considerably from that of the *Phytophaga* of wheat and oats in Italy.

ARACHNIDS.

Acarina.

(71) *Epitetranychus althaeae* v. Hanst. (= *Tetranychus telarius* Auct.). A species reported by myself as causing much damage to papaw and castor oil plants in gardens along the Gasc, near Tessenei, in the western low-lying plain of Eritrea.

WORMS.

Nematoda.

(72) *Heterodera radiculicola* Greeff. This species has continued to damage banana plants in Somaliland, attacking the root system. The heaviest damage occurred in the Genale district.

VERTEBRATES.

Aves.

(73) *Corvus albus* Müll.

(74) *C. capensis kordofanensis* Laubman.

(75) *Rhinocorax rhipidurus* (Hart.).

- (76) *Colius striatus* probably subsp. *erlangeri* Zedlitz.
- (77) *Colius* spp.
- (78) *Lamprocolius chalybaeus*.
- (79) *Spreo* sp.
- (80) *Passer griseus swansonii* Rüpp., *Plocens* sp. and related species.
- (81) *Nectarinia tacazze* Stanley.
- (82) *Streptopelia decipiens decipiens* Finsch., *S. vinacea erythraea* Neum., *S. rossogrisea rossogrisea* Sund.
- (83) *Psittacula* sp. ex *Palaeornis* sp.

These birds have been reported by myself as causing damage to different crops in I. E. A. during 1939, in particular to cereals and fruit trees.

Rodentia.

- (84) *Hystrix galeata galeata* (?) Thomas. A species found to cause severe damage to potato, maize, watermelon and *Musa ensete*.
- (85) Field-voles. Different species are found in I. E. A. In 1939, some damage was caused to cereals and leguminous plants.
- (86) *Tachyoryctes splendens* (?). This rodent has caused damage in southern Scioa to maize, wheat and other crops. Its identification should be confirmed.

Ungulata.

- (87) *Gazella dorcas* L. subsp. *isabella* and
- (88) *G. soemmerringi soemmerringi* Catzschm.

These two species which are fairly numerous in the western low-lying plain of Eritrea, caused considerable damage to cotton and 'bultuc' crops.

Primates.

- (89) *Papio douera* and
- (90) *P. hamadryas*.

These two species of monkeys, very frequent in I. E. A., caused damage to coffee plantations in the western Arussi, Harar, on the slopes descending towards the Lake Zuai plain.

FRANCE.

Two Beetles Injurious to Fruit Trees *

In the spring of 1939, the South-West Station of Agricultural Zoology, in collaboration with the Departmental Agricultural Services, was called upon to deal with attacks, fortunately localized, of the blister beetle (*Cantharis*

* Communication from Dr. JEAN FEYTAUD, Director of the South-West Centre for Phytopathological Research, Talence, Gironde, France.

obscura L.) and the alder leaf beetle (*Agelastica alni* L.) on fruit trees at the flowering season.

The first infestations took place mainly in the Hautes-Pyrénées Department, and the second in the Landes Department.

Among the treatments applied, rotenone powder mixtures appeared to give the best results.

SOUTHERN RHODESIA.

Locust Invasion, 1932-1940 *

Monthly Report No. 88. March, 1940.

Destruction of hoppers of the red locust (*Nomadacris septemfasciata*, Serv.) has been continued during March in the infested districts, which were indicated in the report for January. The northern part of the Gwelo district, the southern part of Sebungwe and the northern part of Mrewa must be added to the January list, whilst the area in which hatchings were reported in Charter has been reported to extend a short distance into the Marandellas district.

No further reports of injury to crops have been received.

In the low veld of the Mtoko district adjacent to the eastern border, swarms of the new generation were reported to be on the wing and circling by the 18th of the month, and the natives were hurriedly reaping their crops.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany (Protectorate of Bohemia and Moravia). — By Ordinance No. 92 of February 8, 1940, the destruction of weeds is compulsory.

The plants to be considered as weeds according to this Ordinance are enumerated.

Proprietors and occupiers of land are required to destroy weeds effectively.

The plants should be destroyed at the latest at the time of seed formation. Plants which have already formed seed, after being dug up, should either be burnt or dug in.

Grasslands and meadows, roadsides and ditches, etc., particularly susceptible to weed invasion, should be mown before the weeds produce seed.

The proprietor of any land, which may constitute a source of damage to neighbouring areas owing to heavy invasion of weeds and the impossibility of checking invasion by ordinary means of control, must change his system of cultivation.

* Communication from the official correspondent of the Institute, Mr. RUPERT W. JACK, F. E. S., Chief Entomologist, Agricultural Laboratory, Department of Agriculture, Salisbury, Southern Rhodesia.

Crop seeds should be cleaned in order eliminate all weed seed in excess of the limit allowed.

Weed seed, should never be thrown on manure or compost heaps, nor utilized for stock feed without previously having been ground in order to destroy their germinative power, or treated in any other manner which will make them innocuous.

Each year, the administrative authorities will advise the communes of the obligation to destroy weeds, and in turn, the communes will call the attention of those concerned to the question.

If any person concerned does not comply with the provisions of this Ordinance, the commune will carry out the necessary operations at the expense of the said person in question. In the case of the commune neglecting this duty, the authorities will take charge.

The Experiment Stations of Prague, for Bohemia, and Brno, for Moravia, are charged with the application of this Ordinance. In carrying out these functions, besides the staff of the experiment stations, use will also be made of persons or institutions authorized and recognized by the Minister of Agriculture.

Information as to the extent of weed invasion will be furnished by reporters of the Plant Protection Service of the different districts.

The inspectors will request the proprietors concerned to accompany them on their inspection of the land, and if it is found that the proprietor has neglected to carry out control operations, he will be required to pay the inspection expenses. (*Ämliche Pflanzenschutzbestimmungen*, Berlin, 1. Mai 1940, Bd. XII, Nr. 3, S. 63-66).

* * By Resolution of March 7, 1940, the import of seeds and plants of forest species from abroad is prohibited. (*Ibid.*, S. 66-67).

Australia (Western Australia). — On January 30, 1940 ragwort (*Senecio jacobaea*) has been declared to be a noxious weed throughout the State. (*Government Gazette of Western Australia*, Perth, February 2, 1940, No. 5, p. 132).

France. — A Decree of March 10, 1940 prohibits the export of nicotine. (*Bulletin de l'Office de Renseignements agricoles*, Paris, 15 mars 1940, n° 6, p. 113).

* * A Ministerial Decree of March 11, 1940 lays down the conditions governing the sanitary inspection of potato crops for seed.

Appended to this Decree are (a) a technical regulation regarding the sanitary inspection of potato crops for seed; (b) technical instructions for inspection; (c) a model of the form for demand for inspection. (*Ibid.*, p. 117-120).

Luxemburg (Grand Duchy of). — By Decree of March 21, 1940, a Commission for crop improvement is formed, which is required, *inter alia*, to carry out the phytopathological inspection of crops, and also of the exports and imports

of plants or parts of plants, to organize control measures against crop pests and to supervise their operation. (*Mémorial du Grand-Duché de Luxembourg*, Luxembourg, 30 mars 1940, n° 19, p. [233]-234).

*** By Decree of March 26, 1940, a Government tax of 4 fr. will be applied to all certificates and documents issued by the Phytopathological Service.

Besides this tax, anyone requiring the services of the officers and experts of the Phytopathological Service is obliged to pay their expenses for the journey and time spent. (*Ibid.*, p. 234-235).

New Zealand. — The Grape-vine Diseases Regulations 1939, of September 20, 1939, govern the control of downy mildew of grape (*Plasmopara viticola*) and vine-louse or phylloxera (*Phylloxera vastatrix*). (*Grape-vine Diseases Regulations 1939*, Wellington, 1939, Serial Number 1939/173, 2 pp.).

*** By Special Order made by the Blenheim Borough Council on September 28, 1939, and published by the Minister of Agriculture on January 4, 1940, all plants mentioned in the Second Schedule of the Noxious Weeds Act, 1928 are declared to be noxious weeds within the boundaries of the Borough of Blenheim. (*The New Zealand Gazette*, Wellington, January 11, 1940, Numb. 1, p. 25).

*** By the Noxious Weeds Act Extension Order 1939, of November 8, 1939, the Second Schedule to the Noxious Weeds Act, 1928 is extended by including therein the plant heath (*Echium vulgare*). (*The Noxious Weeds Act Extension Order 1939*, Wellington, 1939, Serial Number 1939/239, 1 p.).

The Netherlands. — The Royal Decree No. 21 of June 10, 1939 nominates the members of the Commission for narcissus diseases. (*Nederlandsche Staatscourant*, 's-Gravenhage, 19 Juni 1939, A° 1939, N.° 117, blz. 2).

*** The Regulation No. 7842 of July 31, 1939, regards the working of the aforesaid Commission. (*Ibid.*, 1 Augustus 1939, N.° 148, blz. 2).

Syrian Republic. — By Decree No. 354 I.R of December 11, 1939, the import into and transit through Syria and Lebanon of banana plants and bananas of any origin whatsoever are prohibited.

This interdiction does not apply to banana plants introduced into Syria and Lebanon for experimental or scientific purposes provided that: the following conditions are complied with:— (a) a written authorization of importation must be granted by the Department of Agriculture of the State concerned at least seven days before the date of importation; (b) the importer must produce a certificate of phytopathological inspection drawn up in the country of origin,

stating that the plants in question are free from parasites recognized as dangerous to crops; (c) application of sanitary and inspection measures which will be considered necessary before admission of imports.

Inspection of the banana plants will be carried out by an officer of the Agricultural Services on arrival at the port of importation indicated. Plants attacked by any disease whatsoever or not free from parasites recognized as dangerous to crops will either be refused or destroyed or else disinfected according to the conditions laid down by Decree No. 248 of April 19, 1926 and conforming to the prescriptions of the Department of Agriculture of the States of Syria and Lebanon. (*Journal Officiel de la République Syrienne*, Damas, 8 février 1940, 22^{me} année, n° 4, p. 16).

Saint Vincent (Colony of). — An Order in Council made under the Plant Protection Ordinance, No. 14 of 1935, on February 18, 1939, prohibits the transfer or conveyance of seed cotton from the Saint Vincent Grenadines into the Island of Saint Vincent except in certain cases by permit from the agricultural authority in respect of the Islands of Bequia, Battawia and Mustique on proof of fumigation to the satisfaction of the agricultural authority. (*Saint Vincent. Orders in Council, Rules, Regulations and Proclamations for the Year 1939*, Kingstown, 1940, pp. 1-2).

* * By Order in Council made on April 3, 1939 the period beginning on May 1, 1939, and ending on August 15, 1939, for the Islands of Saint Vincent and Mustique and the period beginning on May 1, 1939, and ending on July 31, 1939, for the Saint Vincent Grenadines (except the Island of Mustique) shall be close seasons, respectively, within the meaning of the Cotton Protection Ordinance. (*Ibid.*, p. 25).

* * A Proclamation of June 5, 1939 amends the Proclamation of August 1, 1935, prohibiting the importation of certain plants, etc. into the Colony: — (a) by annulling the application of section 1 (c) (i) with respect to purchases of cotton seed in the Island of Carriacou not exceeding 40 tons and (b) providing that such seed may be brought into the Colony during June, 1939. (*Ibid.*, p. 27).

Switzerland (Canton of Bern). — An Ordinance of June 13, 1939 establishes the measures to be taken for the control of the Colorado beetle [*Leptinotarsa decemlineata*] in the Canton of Bern. (*Bulletin des lois, décrets et ordonnances du canton de Berne*, Berne, année 1939, tome XXXIX de la nouv. sér., p. 43-46).

RECENT BIBLIOGRAPHY

- ABBOTT, E. V. Cytospora rot of sugarcane in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 447-457, figs. 1-2.
[*Cytospora sacchari*].
- ABBOTT, E. V. Red rot of sugarcane. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 682-683.
[*Colletotrichum falcatum*].
- ALFARO, Agustín. El escarabajo de la patata, *Chrysomela* (*Leptinotarsa*) *decemlineata*. *Servicio Nacional de Agricultura. Estación de Patología Vegetal de Zaragoza*, Zaragoza, 1939, 16 págs., 6 figs.
- ARAÚJO, R. L. Duas pragas do abacateiro. *O Biológico*, São Paulo, 1939, ano V, nº. 10, pags. [231]-232.
[*Stericta albifasciata*, *Stenoma catenifer*].
- ARAÚJO, R. L. Brocas de plantas cítricas. *O Biológico*, São Paulo, 1939, ano V, nº. 12, pags. 292-295.
[*Macropophora accentifer*, *Cratosomus reidi*, *Diploschema rotundicollis*, *Ropalophora collaris*, *Trachyderes succinctus*, *T. thoracicus*, *Leptostylus pleurostictus*].
- ATANASOFF, D. Virus diseases of plants: a bibliography. II supplement. *Phytopathologische Zeitschrift*, Berlin 1940, Bd. XII, Heft 6, S. [511]-584.
[See also this *Bulletin*, 1937, No. 10, p. 229].
- ATKINSON, R. E. On the nature of resistance of sugarcane to red rot. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 684-692, figs. 1-5. Literature cited, p. 692.
[*Colletotrichum falcatum*].
- BALACHOWSKY, A. Contribution à l'étude des Coccides du Nord-Africain (21^{me} note)
I. Un *Aclerda* nouveau vivant sur alfa en Algérie. II. Remarques sur les *Aclerda* paléarctiques. *Annales de l'Ecole Nationale d'Agriculture de Grignon*, Paris, 1938-1939, sér. 3, tome I, p. [45]-57, fig. 1-4, pl. I-II.
[*A. pasquieri* n. sp. on *Stipa tenacissima*; *A. subterranea*, *A. berlessei*, *A. panici*].
- BARTLETT, K[enneth] A. A search in the Guianas and Trinidad for predatory beetles of the bambú scales. *The Journal of Agriculture of the University of Puerto Rico*, Río Piedras, P. R., 1939, Vol. XXII (1938), No. 4, pp. 493-495.
[*Azya* spp., *Cryptognatha nodiceps*, *Curinus* sp., *Penulia* spp., predatory beetles of *Asterolecanium bambusae* and *A. milaris*].
- BARTLETT, K[enneth] A. A Dryinid parasite attacking *Balduius maidis* in Puerto Rico. *The Journal of Agriculture of the University of Puerto Rico*, Río Piedras, P. R., 1939, Vol. XXII (1938), No. 4, pp. 497-498. Literature cited, p. 498.
[The parasite was found to be a new species of *Gonatopus* very near *G. bicolor*].
- BARTLETT, Kenneth A. Introduction and colonization of two parasites of the pineapple mealybug in Puerto Rico. *The Journal of Agriculture of the University of Puerto Rico*, Río Piedras, P. R., 1939, Vol. XXIII, No. 2, pp. 67-72. Literature cited, p. 72.
[*Hambletonia pseudococcina* and *Anagyrus coccidivorus*, parasites of *Pseudococcus brevipes*].

- BARTLETT, Kenneth A. The introduction and colonization of the Amazon fly, *Metagonistylum minense* Tns., in Puerto Rico. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 243-245. Literature cited, p. 245.
[A parasite of *Diatraea saccharalis*].
- BARTLETT, Kenneth A. The introduction of predatory beetles in Puerto Rico to aid in the control of the yellow cane aphid, *Sipha flava*. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 383-385. References, p. 385.
- BAYLIS, G. T. S. Hail injury to flax (*Linum usitatissimum*). *The New Zealand Journal of Science and Technology*. A. Agricultural Section, Wellington, N. Z., 1939, Vol. XXI, No. 4 A, pp. 244 A-248 A, figs. 1-4. References, p. 248 A.
- BITANCOURT, A. A. "Pyrenochaeta sacchari n. sp." e uma mancha da folha da cana de açúcar. *Revista da Sociedade Brasileira de Agronomia*, Rio de Janeiro, 1939, vol. II, nº. 3, pags. [91]-94, est. I-II.
[In Portuguese, with title and summary also in English:— 'Pyrenochaeta sacchari n. sp. and a new leaf spot of the sugar cane'].
- BITANCOURT, A. A. Diseases of the sugarcane in Brazil. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 187-193, 1 fig. Literature cited, p. 193.
- BOX, Harold E. Biological control of *Diatraea saccharalis* (Fabricius) in St. Lucia, B. W. I. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 223-240, fig. 1.
- BOX, Harold E. Some aspects of the campaign against the moth borer (*Diatraea saccharalis* Fabr.) in Antigua and St. Kitts, 1931-1938. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 495-513, figs. 1-2. References, p. 513.
- BYNUM, E. K., HALEY, W. E., and CHARPENTIER, I. J. Sources of infestation by the sugarcane borer and trash treatment for the destruction of overwintering borers. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 597-610. Literature cited, p. 610.
[*Diatraea saccharalis*].
- CAMP, A. F., and FUDGE, B. R. Some symptoms of citrus malnutrition in Florida. *University of Florida. Agricultural Experiment Station. Bulletin 335*. Gainesville, Florida, 1939, 55 pp., 11 figs., 8 pls. Literature cited, pp. 45-55.
- CASSAB, Antoine. Le nid et la ponte des courtilières (Orthoptera: Gryllidae-Gryllotalpinae), *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 397-399, fig. 1-2.
[*Gryllotalpa* spp.].
- CERVI, B. Economia di rame ! *Agricoltura Nostra*, Ancona, 1940, anno CI, ser. IV, n. 5, pp. [45]-50.
- CHAMBERLAIN, E. E. Turnip-mosaic. Extended host range and identity. *The New Zealand Journal of Science and Technology*. A. Agricultural Section, Wellington, N. Z., 1939, Vol. XXI, No. 4 A, pp. 212 A-223 A, fig. 1-7. References, p. 223 A.
- CHAMBERLAIN, E. E., and BAYLIS, G. T. S. The occurrence of onion yellow-dwarf in New Zealand. *The New Zealand Journal of Science and Technology*, A. Agricultural Section, Wellington, N. Z., 1939, Vol. XXI, No. 4 A, pp. 229 A-236 A, figs. 1-4. References, pp. 235 A-236 A.
[A virus disease].

- CHESNOKOV, P. G. Methods of characterisation of selected plants for resistance to *Oscinella frit* L. and *Phytophaga destructor* Say. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940. issue 5, pp. 23-30. [Literature], p. 40.
[In Russian, with title also in English].
- CHOUARD, P[ierre]. DURIVAUT, G., LÉCOLIER, P., TROUILJON, et CAYEUX, L. Les gelées de décembre 1938 et leur enseignement pour l'Horticulture. *Revue Horticole*, Paris, 1939, tome XXVI, n° 24, p. 569-570.
- CHOWDHURY, S. A note on potato diseases in India. *The Allahabad Farmer*, Allahabad, P. U., 1939, Vol. XIII, No. 5, pp. [183]-184, 191.
[*Rhizoctonia solani*, *Alternaria solani*, bacteria, *Fusarium*, *Verticillium*, *Sclerotium rolfsii*, *Phytophthora infestans*, virus diseases].
- CLAUSEN, Curtis P. Some phases of biological control work applicable to sugarcane insect problems. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 421-426.
- COMPÈRE, Harold. Description of a new species of *Leptomastix* parasitic on *Phenacoccus hirsutus* Green. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 36-38.
[*L. phenacocci* sp. n. English description].
- COSTA, A. S., e DO AMARAL, Julio Franco. Nota preliminar sôbre uma moléstia das folhas do fumo (*Nicotiana tabacum* L.) causada por *Botryobasidium solani* (Prill. & Del.) Donk. *Revista de Agricultura*, Piracicaba, 1939, vol. XIV, n. 9-10, pages. [389]-397, figs. 1-9.
[With a summary in English].
- COSTA, A. S., e FORSTER, R. Uma suspeita moléstia de virus do fumo (*Nicotiana tabacum* L.), semelhante a "Leaf-curl", presente no Estado de São Paulo. *Jornal de Agronomia*, S. Paulo, 1939, vol. 2, n° 5, pages. [295]-302, figs. 1-9. Bibliographia, pag. 301.
[In Portuguese, with a summary in English].
- COSTA, A. S., e FRAGA júnior, C. G. Sôbre a natureza da ramulose ou superbrotaamento do algodoeiro. *Jornal de Agronomia*, S. Paulo, 1939, vol. 2, n° 3, pages. [151]-160, figs. 1-2.
[In Portuguese, with a summary in English]. — The causal agent of this disorder is referred to as *Colletotrichum gossypii* var. *cephalosporioides*].
- DAMERON, W. H., and SMITH, H. P. Prickly pear eradication and control. *Texas Agricultural Experiment Station. Division of Agricultural Engineering. Agricultural and Mechanical College of Texas. Bulletin 575*. College Station, Brazos County, Texas, 1939, 55 pp., 29 figs.
[*Opuntia* spp.].
- DECOUX, L., et SIMON, M. La jaunisse de la betterave et les propriétés physiques du sol. *Publications de l'Institut belge pour l'amélioration de la betterave*, Renaix, 1939, 7^{me} année, n° 4, p. [223]-237.
[With titles and summaries also in Flemish, German and English:— 'De vergelingsziekte der beet en de fysische eigenschappen van den grond'. — 'Die Rübelgelbsucht und die physikalischen Eigenschaften des Bodeus'. — 'The beet yellows and the physical properties of soils'].
- DIETER, C. E., and WILSON, H. F. Injury to pea vines caused by the feeding of the pea aphid. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 11, pp. 805-814, figs. 1-5.
[*Illinoia pisi*].
- DI PINTO, V. Per evitare gli sprechi degli anticrittogamici in agricoltura. *Agricoltura Napoletana*, Napoli, 1940, anno XVI, n. 4, pp. 53-55.

- DRAKE, Carl J., and FRICK, D. M. Synomy and distribution of the lantana lace bug (Hemiptera: Tingitidae). *Proceedings of the Hawaiian Entomological Society for the Year 1938*, Honolulu, Hawaii, 1939, Vol. X, No. 2, pp. 199-202, fig. 1. [The introduction of *Teleonemia scrupolosa* and other lantana-feeding insects into the Hawaiian Islands from Mexico represents the first attempt to control noxious weeds by means of insects].
- DUGAS, A. L. Trend in natural parasitism of sugarcane borer, *Diatraea saccharalis* (F.), by *Trichogramma* spp. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 361-367.
- DU PLESSIS, S. J. A comparison of the effectiveness of various fungicides and the methods of their application for the control of Botrytis rot of grapes. *Union of South Africa. Department of Agriculture and Forestry (Stellenbosch-Elsenburg Series No. 37). Science Bulletin No. 199*, Pretoria, 1939, 31 pp. Literature, p. 29.
[With a summary also in Afrikaans].
- EDDINS, A. H. Some characteristics of bacterial ring rot of potatoes. *American Potato Journal*, Somerville and New Brunswick, N.J., 1939, Vol. 16, No. 12, pp. [309]-322, figs. 1-7. Literature cited, pp. 321-322.
[*Phytophthora septedonica*].
- EDDY, C. O. An attempt to colonize *Hippodamia convergens*. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*, Baton Rouge, Louisiana, 1939, pp. 385-386.
- EDDY, C. O. Sugar and sugar products in insecticides. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 705-708.
- ELLISOR, L. O., and INGRAM, J. W. Experiments with insecticides in the control of the sugarcane borer, *Diatraea saccharalis* (Fab.). *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 693-705. References, p. 705.
- FAES, H[enri]. Bouillies cupriques ordinaires et oxychlorure de cuivre. *La Terre Vaudoise*, Lausanne, 1940, XXXII^{me} année, n° 21, p. 266.
[According to the author, the control of the downy mildew of the vine (*Plasmopara viticola*) by means of copper oxychloride, easily applied, should be given greater consideration in the different wine-growing countries].
- FERDINANDSEN, C., og JØRGENSEN, C. A. Skovtraeernes sygdomme. København, Gyldendalske Boghandel, Nordisk Forlag, 1938-39, XI + 571 s., 220 fig., 2 tav. Literaturfortegnelse, s. [524]-545.
[A treatise on diseases of forest trees, written in Danish].
- FERNÁNDEZ, F. J. Las heladas ocasionan serios perjuicios a la producción frutícola. *El Campo*, Buenos Aires, 1939, año XXIII, n° 272, págs. 30 y 31, 2 figs.
- FERNÁNDEZ, F. J. Siembra de trigo y lino. Destrucción del sorgo de Alepo. *El Campo*, Buenos Aires, 1939, año XXIII, n° 272, págs. 32 y 33, 2 figs.
[*Sorghum halepense*].
- FIFE, L. Courtney. Alternate host plants of the pink bollworm, *Pectinophora gossypiella* (Saund.), in Puerto Rico. *Journal of Agriculture of the University of Puerto Rico*, Río Piedras, P. R., 1939, Vol. XXII (1938), No. 4, pp. 483-492, fig. 1. Literature cited, pp. 491-492.
- FONSECA, J. Pinto da. O *Heterospilus coffeicola* Schmied e sua introdução no Brasil. *Jornal de Agronomia*, S. Paulo, 1939, vol. 2, n° 1, págs. [57]-59.

- FONSECA, J. P[into da], e ARAUJO, R. L. Informações sobre a praga das cigarras em S. Paulo e sobre as possibilidades de seu combate. *O Biológico*, São Paulo, 1939, ano V, n° 12, págs. 285-291, est. XI-XII. [*Fidicina* and *Quesada* spp.].
- FORBES, I. L. Immunity studies with sugarcane mosaic. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 566-572. Literature cited, p. 572.
- FOSCOLO, Em., et LEFÈVRE, P.-C. Culture et parasites de la patate douce dans l'Ituri. *Bulletin Agricole du Congo Belge*, Bruxelles, 1939, vol. XXX, n° 3, p. [404]-420, fig. 102-104. Bibliographie, p. 420.
- GABOTTO, L[uiigi]. Lo zolfo quale mezzo autarchico per risparmiare il solfato di rame. *Il Coltivatore e Giornale Vinicolo Italiano*, Casale Monf., 1940, anno 86°, n. 9, pp. 101-103.
- GALACHIAN, R. M. Resistance investigations of different varieties of *Phaseolus* to bacteriosis. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1939, issue 23-24, pp. 23-[27]. [In Russian, with title also in English].
- GAMBIOLI, A. Economia di rame nella lotta anticrittogamica. *Sabina Agricola*, Rieti, 1940, anno XII, n. 7, pp. [1]-[2].
- GARLOUGH, F. F. Rodents in relation to sugarcane growing. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 98-105. References, p. 105.
- GARMENDIA, Juan Ortiz. Un nuevo enemigo de los almácigos de ají. *El Agricultor del Norte*, La Serena (Chile), 1939, año 25, n° 11, pág. 271. [*Rhizoctonia*].
- GASSNER, Gustav. Untersuchungen über das "Mal secco" oder "Kurutan" der Limonbäume. *Phytopathologische Zeitschrift*, Berlin 1940, Bd. XIII, Heft 1, S. 1-90, Abb. 1-50. Schriftenverzeichnis, S. 89-90. [*Deuterophoma tracheiphila* Petri (= *Phoma limoni* Thuem. ?)].
- [GIMINGHAM, C. T., and BUCKHURST, A. S.]. Report on insect pests of crops in England and Wales, 1935-1937. *Ministry of Agriculture and Fisheries. Bulletin No. 118*, London, 1939, VI + 64 pp., 1 map. References, pp. 50-59.
- GOMES, Jalmirez G., e REINIGER, Carlos H[enrique]. Nota prévia sobre uma nova praga de laranjeira. *Revista da Sociedade Brasileira de Agronomia*, Rio de Janeiro, 1939, vol. II, n° 1, pag. [26], 2 figs. [*Zaldacera fumata*].
- GONÇALVES, Cincinnato Rory, e REINIGER, Carlos Enrique. Sobre um percevejo sugador de laranjas, *Leptoglossus gonagra* (Fabr., 1775). Hem., Coreidae. *Revista da Sociedade Brasileira de Agronomia*, Rio de Janeiro, 1939, vol. II, n° 3, pags. [97]-100, fig. 1. Bibliographia, pags. 99-100.
- GOODEY, T. The nematode parasites of plants catalogued under their hosts. *Imperial Bureau of Agricultural Parasitology (Helminthology)*, St. Albans, England, 1940, 80 pp. Price 10/- post free.
- GÖSSWALD, Karl. Über den insektentötenden Pilz *Beauveria bassiana* (Bals.) Vuill. Bisher Bekanntes und eigene Versuche. *Arbeiten aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1939, XXII. Bd., Heft 4, S. [399]-452, 1 Taf. Literatur, S. 438-452.
- GREBENNIKOV, S. D. The pseudo-rosette disease (pupafication) of oats in Siberia. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 4, pp. 17-[21]. [Literature], p. [21]. [In Russian, with title also in English].

- GRILLO, Heitor V. Silveira. On the red stripe of sugarcane in Brazil. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 427-430, figs. 1-2. Literature cited, p. 430.
[*Phylomonas rubrilineans*].
- GROVE, A. The elm disease in 1939. *The Gardeners' Chronicle*, London, 1940, Third Series, Vol. CVII, No. 2773, p. 80.
[*Graphium ulmi*].
- GRUNBERG, A. Insects injurious to vegetables and shrubs in the Jordan Valley, Huleh area and the Upper Galilee. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 1-9.
- GUYOT, A. L. Etudes expérimentales sur les Urédinées hétéroïques réalisées au Laboratoire de Botanique de l'Ecole Nationale d'Agriculture de Grignon (Seine-et-Oise) au cours des années 1938-1939. *Annales de l'Ecole Nationale d'Agriculture de Grignon*, Paris, 1938-1939, sér. 3, tome I, p. [58]-68.
[*Puccinia* spp., *Uromyces* spp.].
- HANNA, A. D. Studies on the Mediterranean fruit fly: *Ceratitis capitata* Wied. I. The structure and operation of the reproductive organs. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 39-[59], pls. I-V. References, p. 48.
- HASSEBRAUK, K. Untersuchungen über die physiologische Spezialisierung des Weizen- und Haferschwartzrostes in Deutschland in Jahre 1937. *Arbeiten aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1939, XXII. Bd., Heft 4, S. [479]-482. Schriftennachweis, S. 482.
[*Puccinia graminis tritici* and *P. graminis avenae*].
- HILL, C. C., PINCKNEY, J. S., and UDINE, E. J. Status and relative importance of the parasites of the Hessian fly in the Atlantic States. *United States Department of Agriculture. Technical Bulletin No. 689*, Washington, D. C., 1939, 15 pp.
[In all. 18 species of hymenopterous parasites have been found parasitizing *Phytophaga destructor* in the wheat-growing areas of the eastern coastal States. By far the most important among these were *Platygaster hiemalis*, *P. zosine* and *Eupelmus allynii*. Other parasites of varying importance were *P. herickii*, *Merisus destructor*, *M. febriculosus*, *Tetrastichus carinatus*, *Pleurotropis metallicus* and *Eupelmella vesicularis*. The remaining species were of insignificant value].
- HOLLOWAY, T. E. Introductions and recoveries of parasites of sugarcane insects in continental United States. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 258-261.
[Parasites of *Diatraea saccharalis*, *Euethola rugiceps* and *Pseudococcus boninsis*].
- HUGHES, C. G. Alternate hosts of *Bacterium vascularum*. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 430-437, fig. 1. Literature cited, pp. 436-437.
- HUIPOI, Aurelia. Câteva boale criptogamice noi apărute în anul 1939 în România. *Viața Agricolă*, București 1940, an. XXXI, no. 5, pag. 134-138, fig. 1-5.
[Fungi recently reported in Rumania during 1939:— *Cladosporium fulvum* and *Clasterosporium castanicolum*].
- HUSMANN, George C., SNYDER, Elmer, and HUSMANN, Frederik L. Testing vinifera grape varieties grafted on phylloxera-resistant rootstocks in California. *United States Department of Agriculture. Technical Bulletin No. 697*, Washington, D. C., 1939, 63 pp., 5 figs. Literature cited, p. 63.
[*Phylloxera vitifoliae*].

ING, E[rnest] G. Horticulture. *Rapports: 1^o du Directeur de la Ferme d'Expériences "Howard Davis", Trinité; 2^o de l'Expert ayant trait aux maladies affectant les pommes de terre et les tomates; 3^o de l'Expert pour la culture et le soin des arbres à fruit, etc.; et 4^o du Chimiste-Analyste en matière d'Agriculture, avec tableaux y annexés, pour l'année 1939.* Jersey, 1940, pp. 44-54.

[The following pests and diseases were of particular interest in the Island of Jersey during 1939:— *Atomaria linearis*, *Helophorus rugosus*, *Phaedon cochleariae*, *Otiorrhynchus singularis*, *Chortophila brassicae*, *Heterodera schachtii*, *Gracilaria syringella*, *Orchestes* sp., *Sclerotinia sclerotiorum*, *Bacillus tracheiphilus*, *Botrytis cinerea*].

ING, E[rnest] G., and SMALL, T[homas]. Potato root eelworm (*Heterodera schachtii*). *Rapports: 1^o du Directeur de la Ferme d'Expériences "Howard Davis", Trinité; 2^o de l'Expert ayant trait aux maladies affectant les pommes de terre et les tomates; 3^o de l'Expert pour la culture et le soin des arbres à fruit, etc.; et 4^o du Chimiste-Analyste en matière d'Agriculture, avec tableaux y annexés, pour l'année 1939.* Jersey, 1940, pp. 35-43.

INGRAM, J. W., BYNUM, E. K., and DOUGLAS, W. A. A summary of investigations on the sugarcane beetle in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 478-482.
[*Euctheola rugiceps*].

INGRAM, J. W., HALEY, W. F., and CHARPENTIER, L. J. Insect vectors of sugarcane mosaic in continental United States. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 483-494.

INGRAM, J. W., JAYNES, H. A., and LOBDELL, R. N. Sugarcane pests in Florida. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, pp. 89-98.

INSTITUT INTERNATIONAL D'AGRICULTURE. *Annuaire international de législation agricole.* XXIX^{ème} année-1939. Rome, 1940, XLVII-965 p. Prix: 80 liras, franco de port et d'emballage.

[As before, the seventh part of this Yearbook treats on the legislative measures regarding plant protection].

JAYNES, H. A. Further attempts to establish *Lixophaga diatraeae* (Townsend) and other sugarcane borer parasites in Louisiana and Florida, with recoveries in 1936 and 1937. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 245-258. Literature cited, pp. 257-258.

[*L. diatraeae*, *Ipobracon rimae*, *Theresia claripalpis*, *Bassus stigmaterus*, *B. texanus*, *B. nigrotrochantericus*, and *B. sanctus* as parasites of *Diatraea saccharalis*].

JEPSON, W. F., and MOUTIA, L. A. The progress of applied entomology in Mauritius during the years 1933 to 1938, with reference to insects of the sugarcane. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 377-382. References, p. 382.

KIRYU, Tomojiro, and OKADA, Mampachi. Sclerotic disease of sugarcane. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 785-792, figs. 1-5.
[A physiological disease].

KOSTOFF, Dontcho. Atypical growth, abnormal mitosis and polyploidy induced by ethyl-mercury-chloride. *Phytopathologische Zeitschrift*, Berlin 1940, Bd. XIII, Heft 1, S. [91]-96, figs. 1-2. Literature cited, S. 96.

- KRAMER, M. A degenerescência e a defesa da cultura da batatinha. *O Biológico*, São Paulo, 1939, ano V, nº 12, pags. [265]-272.
- LAROSE, E., et VANDERWALLE, R. Nouvelles recherches sur le charbon du froment. *Bulletin de l'Institut agronomique et des Stations de Recherches de Gembloux*, Gembloux, 1939, tome VIII, nº 3-4, p. [205]-214, fig. 1-2.
[With titles and summaries also in Flemish, German and English. — *Ustilago nuda tritici*].
- LEBEAU, Francis J. The relation of environmental factors and antagonistic organisms to root rot of sugarcane and corn. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 342-347, figs. 1-3.
[*Pythium*, *Trichoderma*].
- LEVER, R. J. A. W. Entomological notes. *Agricultural Journal*, Suva, 1939, Vol. 10, No. 3, pp. 83-87.
[Contains:—
(1) The malarial mosquito in the South Seas.
(2) The rice leaf-hopper. [*Sogata furcifera*].
(3) Control of cutworms on grasses. [*Spodoptera*].
(4) Rice insects. [*Spodoptera mauritia*, *Cirphis unipuncta*, *Sogata furcifera*, *Leptocoris varicornis*, *Coccinella 8-maculata*, *Oryzaephilus surinamensis*, *Tribolium castaneum*, *T. ferrugineum*, *Diocalandra oryzae*, *Necrobia rufipes*, *Alphitobius laevigatus*].
(5) Notes on white ants. [*Cryptotermes buxtoni* ?].
- LIESE. The occurrence in the British Isles of the Adelopus disease of Douglas fir. *Quarterly Journal of Forestry*, London, 1939, Vol. XXXIII, No. 4, pp. 247-252, 1 pl.
- MANIL, P. A propos de l'appréciation de l'activité des produits fongicides. *Bulletin de l'Institut agronomique et des Stations de Recherches de Gembloux*, Gembloux, 1939, tome VIII, nº 3-4, p. [215]-222.
[With titles and summaries also in Flemish, German and English].
- MANOLACHE, C. *Achantiophilus helianthi* Rossi. *Viața Agricolă*, București 1940, an. XXXI, nr. 3, pag. [65]-67, fig. 1-6. Literatură, pag. 66-67.
[A parasite of the fruits of *Carthamus tinctorius*].
- MARANTHÃO, Z. C. Pragas das Cucurbitaceas cultivadas. *Revista de Agricultura*, Piracicaba, 1939, vol. XIV, n. 9-10, pags. [371]-388, figs. 1-9. Bibliographia, pags. 387-388.
[*Leptoglossus gonager*, *Aphis gossypii*, *Margarodes brasiliensis*, *Heliothis obsoleta*, *Diaphania nitidalis*, *D. hyalinata*, *Melittia satyriiformis*, *M. riograndensis*, *Epilachna clandestina*, *E. paenulata*, *Diabrotica speciosa*, *D. bivittula*, *D. signficata*, *D. quadriplagiata*, *D. rufolimbata*, *Adetus muticus*, *Pterodia* sp., *Phymalophosus squamans*, *Anastrepha grandis*].
- MARLOWE, Ralph H. Note on *Ananca bicolor* (Fairm.) (Col.). *Proceedings of the Hawaiian Entomological Society for the Year 1938*, Honolulu, Hawaii, 1939, Vol. X, No. 2, p. 223.
[On sweet corn].
- MARSAIS, P., et SÉGAL, L. Le court-noué contagieux a-t-il les caractères d'une maladie à virus? *Revue de Viticulture*, Paris, 1939, 46^e année, tome XCI, nos 2.368-2.369, p. 333-337.
- MARTIN, J. P. Stem galls of sugarcane induced with an insect extract. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 461-467, figs. 1-5. Literature cited, pp. 466-467.
[*Draeculacephala mollipes*].
- MASON, L. "Ascu" wood preservative. *Current Science*, Bangalore, 1940, Vol. 9, No. 4, pp. 187-188.

- MATHES, Ralph, INGRAM, J. W., and HALEY, W. E. Preliminary report on studies of progenies of sugarcane crosses for susceptibility to sugarcane borer injury in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 581-589.
- MATZ, Julius. Comparative study of sugarcane mosaic from different countries. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 572-580, figs. 1-2.
- McMARTIN, A. Some preliminary trials on the control of sett-rot in Natal. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 457-460.
[A number of different organisms are associated with this disease].
- MEHL, Sigbert. Die häufigsten Schädlinge des landwirtschaftlichen Getreidespeichers mit besonderer Berücksichtigung des Kornkäfers (*Calandra granaria* Linné). *Praktische Blätter für Pflanzenbau und Pflanzenschutz*, München 1939, XVII. Jahrg., Heft 7/8, S. [161]-194, Taf. I-XII.
- MEYER-HERMANN, K. Der Stengelkropf der Luzerne. *Deutsche Landwirtschaftliche Presse*, Berlin 1939, 66. Jahrg., Nr. 50, S. 563-564, Abb. 702-704.
[*Urophylctis aljalfae*].
- MIOTTO, G. Il consumo del rame e la lotta contro la peronospora della vite. *Il Gazzettino Agricolo*, Padova, 1940, anno XIII, n. 20, p. [2].
[*Plasmopara viticola*].
- NAIDENKO, A. I. Desinfection of barley seeds against helminthosporioses. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 3, pp. 21-[23]. [Literature], p. [23].
[In Russian, with title also in English].
- NICOLAISEN, W., LEITZKE, B., und WITZIG, I. Untersuchungen im Rahmen der Züchtung der Kleearten auf Widerstandsfähigkeit gegen den Kleekehl (*Sclerotinia trifoliorum* Erikss.) *Phytopathologische Zeitschrift*, Berlin 1940, Bd. XII, Heft 6, S. [585]-685, Abb. 1-10. Schriftenverzeichnis, S. 645.
- OCFEMIA, G. O. A review of sugarcane diseases in the Philippines. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 183-187.
- OCFEMIA, G. O., and CELINO, M. S. Some recent findings regarding Fiji disease of sugarcane in the Philippines. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 550-554, figs. 1-2. Literature cited, p. 554.
[A virus disease].
- ORIAN, G. Natural hosts of *Bacterium vascularum* (Cobb) Gr. Smith in Mauritius. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 437-447, figs. 1-4. Literature cited, p. 447.
- OTERBERGER, B. A., and CHRISTIAN, M. B. Biology and importance of the sugarcane rootstock weevil (*Anacetrinus subnudus* Buch.) in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 472-475. Literature cited, p. 475.
- PADWICK, G. Watts. A new disease of wheat in India. *Current Science*, Bangalore, 1940, Vol. 9, No. 4, pp. 179-180, 1 fig.
[*Ophiobolus graminis*?].

- PEMBERTON, C. E. Quarantine measures against insects carried by transpacific airplanes. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 595-596.
- PIACCO, R. Delle erbe infestanti della risaia. *Risicoltura*, Vercelli, 1939, anno XXIX, n. 12, pp. 351-354; 1940, anno XXX, n. 1, pp. 10-15, 8 figg.; n. 2, pp. 37-40, 2 figg.; n. 3, pp. 66-69.
[The most noxious species belong to the genera *Panicum*, *Scirpus*, *Alopecurus*, *Alisma*, *Heleocharis*, *Oryza*, *Hydrodictyon*, *Spirogyra*, *Sphaeroplea*].
- POHJAKALLIO, Onni. Untersuchungen über den Kleekebs und seinen Anteil am Verschwinden des Klees in Klee-Grasgemischen. *Pflanzenbau*, Leipzig 1939, 16. Jahrg., Heft 4, S. 136-160, Abb. 1-10; Heft 5, S. 201-204. Literatur, S. 203-204.
[*Sclerotinia trifoliorum*].
- PRIESNER, H. A brief note on the relation between the physiological condition of plants and insect attack. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 279-283.
- RADA, Germán García. El mildiú de la lechuga. *Ministerio de Fomento. Dirección de Agricultura y Ganadería. Circular No. 49*, Lima-Perú, 1939, 8 págs., 1 fig. Literatura citada, pág. 8.
[*Bremia lactucae*].
- RAÑA, Eduardo A[ntonio]. Pulverización y expolvoreo de los algodones. *El Campo*, Buenos Aires, 1939, año XXIII, n.º 271, págs. 53 a 56, 5 figs.; n.º 272, págs. 35 a 38, 6 figs.
- RAÑA, Eduardo Antonio. Medidas de prevención contra las plagas del algodón. *El Campo*, Buenos Aires, 1939, año XXIII, n.º 277, págs. 48 a 52, 8 figs.
- RANDS, R. D., and ABBOTT, E. V. Sugarcane diseases in the United States. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 202-212. Literature cited, pp. 211-212.
- RANDS, R. D., and DOPP, Ernest. Pythium root rot of sugarcane. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 680-681.
[*Pythium arrhenomanes*].
- RIVERA, V[incenzo]. Il fattore chimico nel parassitamento dei vegetali. *Atti del X Congresso Internazionale di Chimica*, Roma, 1939, vol. V, pp. 612-624.
- ROBERTSON, W. C. The Fungicides Act. Registrations for 1940. *The Journal of the Department of Agriculture, Victoria, Australia*, Melbourne, 1940, Vol. XXXVIII, Pt. 4, pp. 194-199, 2 figs.
[The list of registered fungicides, insecticides, etc., will be found in the supplement to this issue].
- ROSENFELD, Arthur H. Minor sugarcane diseases in Egypt. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 194-197.
- RUSSO, Giuseppe. Un nuovo Piralide, *Mabra russoi* Schaus, dannoso alla canna da zucchero nella Repubblica Dominicana (Antille). *Rivista di Biologia Coloniale*, Roma, 1940, vol. III, fasc. I-II, pp. [139]-144, figg. I-II.
[With titles and summaries in French, English and German:— '*Mabra russoi* Schaus, nouveau Pyralide nuisible à la canne à sucre dans la République Dominicaine'. — '*Mabra russoi* Schaus, a new Pyralidae injurious to the sugar cane in the Dominican Republic'. — 'Eine neue Pyralidae, *Mabra russoi* Schaus, als Zuckerrohrschädling in der Dominikanischen Republik (Antillen)'].

- RYKER, T. C. The Rhizoctonia disease of Bermuda grass, sugarcane, rice and other grasses in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 198-201, figs. 1-2. References, p. 201.
[*Rhizoctonia solani*].
- SAKIMURA, K. On the host plants of some Hawaiian thrips. *Proceedings of the Hawaiian Entomological Society for the Year 1938*, Honolulu, Hawaii, 1939, pp. 251-254. Literature cited, p. 254.
- SANDU-VILLE, C., și HULPOI, Aurelia. Resistența câtorva soiuri de grâu la infecțiunea cu mătura. *Viața Agricolă*, București 1940, an. XXXI, no. 2, pag. 37-40.
[Resistance of some varieties of wheat to *Tilletia foetens*].
- SASSER, E. R. Plant quarantine restrictions on the entry of sugarcane into the United States. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 611-616.
- SCARAMUZZA, L. C. The introduction of *Theresia claripalpis* V. d. W., into Cuba, and its artificial multiplication. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 589-595, figs. 1-2. Literature cited, pp. 594-595.
[For the biological control of the sugar cane borer, *Diatraea saccharalis*].
- SEELIGER, R. Beobachtungen über das Auftreten der Perithezien des Echten Mehltaus der Rebe. *Arbeiten aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1939, XXII. Bd., Heft 4, S. [453]-478, Abb. 1-2. Angeführte Schriften, S. 477-478.
[*Uncinula necator*].
- SEMENTOV, A. E. On harm of the flax weevil. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 3, pp. 24-[27].
[Literature], p. [27].
[In Russian, with title also in English. -- *Ceutorhynchus*].
- SERGEANT, Edmond, PARROT, L., HORRENBERGER, R. Pour l'unification de la terminologie concernant les «contages, microbes invisibles; virus filtrables, virus, ultravirus, inframicrobes, etc.». *Bulletin de l'Institut Pasteur*, Paris, 1940, tome 38, n° 9, p. [385]-395.
- SHAFER, M. L. Seed selection and roguing in the practical control of mosaic disease of sugarcane in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 554-563. Literature cited, pp. 562-563.
- SHAFIK, Mohamed. Constant temperature hot air sterilizer for the control of *Ephestia* and *Myelois* on dates. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 233-[264], fig. 1, pls. I-V.
- SHAFIK, Mohamed, AMER, A., and HILMY, A. L. Efficiency of commercial sodium cyanide and sulphuric acid in liberating hydrocyanic acid gas for the fumigation of citrus trees in Egypt against scale insects. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 301-345, fig. 1, graphs I-XXVII.
- SHAFIK, Mohamed, and HILMY, A. L. A mud brick oven for drying dates and controlling *Ephestia*. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 265-[278], fig. 1, pls. I-II.
- SHAFIK, Mohamed, and HUSNI, Mahmoud. The ideal spray emulsion for the control of scale insects on citrus in Egypt. *Bulletin de la Société Fouad 1^{er} d'Entomologie*, Le Caire, 1939, XXXI^{ème} année, XXII^{ème} vol. (1938), p. 357-395.
- SILVEIRA, Verlande Duarte, e REINIGER, C[arlos] H[enrique]. Estiolamento das sementeiras de citrus causado pelo fungo *Sclerotium Rolfsii* Sacc. *Revista da Sociedade Brasileira de Agronomia*, Rio de Janeiro, 1939, vol. II, n° 2, pags. [165]-168, figs. 1-7.

- SMALL, T[homas]. Tomato stem rot or canker (*Didymella lycopersici*, Kleb.). *Rapports: 1^o du Directeur de la Ferme d'Expériences "Howard Davis", Trinité; 2^o de l'Expert ayant trait aux maladies affectant les pommes de terre et les tomates; 3^o de l'Expert pour la culture et le soin des arbres à fruit, etc.; et 4^o du Chimiste-Analyste en matière d'Agriculture, avec tableaux y annexés, pour l'année 1939.* Jersey, 1940, pp. 22-32.
- SMALL, T[homas]. Colorado beetle. *Rapports: 1^o du Directeur de la Ferme d'Expériences "Howard Davis", Trinité; 2^o de l'Expert ayant trait aux maladies affectant les pommes de terre et les tomates; 3^o de l'Expert pour la culture et le soin des arbres à fruit, etc.; et 4^o du Chimiste-Analyste en matière d'Agriculture, avec tableaux y annexés, pour l'année 1939.* Jersey, 1940, pp. 33-35. [*Leptinotarsa decemlineata*].
- SMYTH, E. Graywood. Trichogramma proves itself in sugarcane borer control. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 367-377, figs. 1-3. [*Trichogramma* against *Diatraea saccharalis*].
- SORENSEN, Hans. The behavior of mosaic on certain soils and mosaic in regard to cane breeding. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 357-360.
- SOUZA, Decio A. Um bom adesivo na aplicação do arseniato de chumbo. *O Biológico*, São Paulo, 1939, ano V, n^o 12, pages. 297-298.
- STEVENSON, G. C. Breeding and testing sugarcane seedlings for mosaic disease resistance at the British West Indies Central Sugar Cane Breeding Station, Barbados. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 71-75.
- STEVENSON, G. C. Breeding and testing sugarcane seedlings for gumming disease resistance at the British West Indies Central Sugar Cane Breeding Station, Barbados. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, 1939, pp. 75-78. References, p. 78. [*Bacterium vasculorum*].
- STRAIB, W. Weiterer Beitrag zur Frage der Spezialisierung von *Puccinia glumarum* (Schm.) Frikss. et Henn. *Arbeiten aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft, Berlin-Dahlem*, Berlin 1939, XXII. Bd., Heft 4, S. [571]-579. Schriftenverzeichnis, S. 579.
- SUMMERS, Eaton M. A study of the common mosaic of sugarcane with special reference to strains of the virus. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 564-565.
- [SWEZEY, O. H., FULLAWAY, D. T., MASON, A. C., HOLDAWAY, F. G., and SAKIMURA, K.]. Recent records of the introduction of beneficial insects into the Hawaiian Islands. *Proceedings of the Hawaiian Entomological Society for the Year 1938*, Honolulu, Hawaii, 1939, Vol. X, No. 2, pp. 349-352.
- TAKANO, S., and KONDO, T. The field rats and their control in Formosa. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 106-112, figs. 1-3. [*Bandicota nemorivaga*, *Rattus norvegicus*, *R. losea*, *Apodemus agrarius ningpoensis*, *Mus formosanus*].
- TIMS, E[ugene] C. Recent developments in sugarcane pathology. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938.* Baton Rouge, Louisiana, 1939, pp. 213-222. Literature cited, pp. 221-222. [In the world].

- TIMS, Eugene C. Dwarf or multiple bud disease of sugarcane in Louisiana. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*. Baton Rouge, Louisiana, 1939, pp. 467-471, figs. 1-6. Bibliography, p. 471.
- TORRIE, James H. Correlated inheritance in oats of reaction to smuts, crown rust, stem rust, and other characters. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 11, pp. 783-804, figs. 1-5. Literature cited, pp. 802-804. [*Ustilago avenae*, *U. levis*, *Puccinia coronata avenae*, *P. graminis avenae*].
- TORO, Rafael A. *Pugillus fungorum venezuelensis*. *The Journal of Agriculture of the University of Puerto Rico*, Río Piedras, P. R., 1939, Vol. XXII (1938), No. 4, pp. 449-454, pl. XIII. Literature cited, p. 453.
[A description is given, *inter alia*, of *Schiffnerula paraparensis* n. sp. on *Bursera tomentosa*; and *Kerniomyces costi* n. gen. and n. sp. on *Costus macrostachys*. Latin diagnoses].
- TPOGRAF, D. J. On the diagnosis of the ring rot of potatoes. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1939, issue 23-24, pp. 28-[30]. [Literature], p. [30].
[In Russian, with title also in English. — *Bacterium sepedonicum*].
- TRUNOV, G. A. On studies of bacteriases (black chaff) of winter wheat. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 1, pp. 23-[29].
[In Russian, with title also in English. — *Bacterium translucens* var. *undulosum*].
- TUCKER, B. W. E. Some aspects of the control of the sugarcane moth borer, *Diatraea saccharalis* F. *International Society of Sugar Cane Technologists. Proceedings of the Sixth Congress held at Louisiana State University, Baton Rouge, Louisiana, October 24 to November 5, 1938*, Baton Rouge, Louisiana, 1939, pp. 240-243.
- USINGER, Robert L. Distribution and host relationships of *Cyrtorhinus* (Hemiptera: Miridae). *Proceedings of the Hawaiian Entomological Society for the Year 1938*, Honolulu, Hawaii, 1939, Vol. X, No. 2, pp. 271-273.
[The genus *Cyrtorhinus* seems destined to play an increasingly important role in the biological control of Delphacid leafhoppers].
- VAN DEN BRUEL, W. E. A propos de la lutte contre les mouches de la chicorée de Bruxelles (*Napomyza lateralis* Fall. et *Ophyomyia pinguis* Fall.). Efficacité du traitement à l'eau chaude. *Bulletin de l'Institut agronomique et des Stations de Recherches de Gembloux*, Gembloux, 1939, tome VIII, nos 3-4, p. [188]-193, graphique I.
[With titles and summaries also in Flemish, German and English].
- VAN DEN BRUEL, W. E. Note sur le mode d'hivernation des mouches de la chicorée de Bruxelles, *Napomyza lateralis* Fall. et *Ophyomyia pinguis* Fall. (Agromyzidae). *Bulletin de l'Institut agronomique et des Stations de Recherches de Gembloux*, Gembloux, 1939, tome VIII, nos 3-4, p. [223]-230.
[With titles and summaries in Flemish, German and English].
- VIÉGAS, A. P. *Tomentella bambusina* n. sp., causadora da seca do bambú. *Jornal de Agronomia*, S. Paulo, 1939, vol. 2, n° 5, pags. [313]-326, figs. 1-9. Literatura citada, pag. 325.
[The Latin diagnosis is given of this new species of Thelephoraceae].
- VIÉGAS, A. P. A ocorrência de *Rosellinia bunodes* em Ubatuba, Estado de S. Paulo. *Jornal de Agronomia*, S. Paulo, 1939, vol. 2, n° 5, pags. [327]-328, figs. 1-3. Literatura citada, pag. 328.
- VIENNOT-BOURGIN, G. Contribution à la connaissance de la mycoflore de l'archipel de Madère. *Annales de l'Ecole Nationale d'Agriculture de Grignon*, Paris, 1938-1939, sér. 3, tome I, p. [69]-169, fig. 1-21, pl. I-V.
- VON WINNING, Erika. Auftreten und Ausbreitung des Kartoffelkäfers im europäischen Auslande im Jahre 1939. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1940, 20. Jahrg., Nr. 5, S. 24-25.
[*Leptinotarsa decemlineata* in the Netherlands, Luxemburg, Switzerland, Lichtenstein, Jersey and Spain].

and Ojo de Agua, Province of Santiago del Estero, egg-laying was insignificant. Hatchings were very scattered.

Nymphs were reported towards the end of the period in question in the following Departments:—

Province of Santa Fé: Caseros, General López, Constitución. Not very marked.

Province of Córdoba: San Justo, Río 1, Río 2, Santa María, Totalal, Pocho, San Alberto, Marcos Juárez, Río Cuarto, Juárez, Celman, Calamuchita, 3rd Arriba, 3rd Abajo, Unión.

Province of San Luis: General Pedernera, Colonel Pringles, Chacabuco, Junín.

Province of Santiago del Estero: Ojo de Agua. Intensity not very marked.

Province of Tucumán: Burruyacu. Not very marked.

Control was effected by means of flame throwers, barriers, collection and spraying, and a very large number of locusts at their various stages were destroyed. Spraying gave the best results as seen from the following table:—

South American locusts (*Schistocerca paranensis*) destroyed
from October to December 31, 1939.

| | | Provinces | | | | | | Total |
|----------------------------------|-------|--------------|-----------|-------------|----------|---------------------|---------|-------------|
| | | Buenos-Aires | Santa Fé | Córdoba | San Luis | Santiago del Estero | Tucumán | |
| Spraying by planes and gangs:— | | | (a) | (b) | | | | |
| Adults Kg. | — | — | 7,814,925 | 53,523,000 | — | — | — | 61,337,925 |
| Ha. | — | — | 2,313 | 6,544 | — | — | — | 8,857 |
| Larvae Kg. | — | — | — | 21,090,000 | — | — | — | 21,090,000 |
| Ha. | — | — | — | 3,747 | — | — | — | 3,747 |
| Nymphs Kg. | — | — | — | 115,905,000 | — | — | — | 115,905,000 |
| Ha. | — | — | — | 14,174 | — | — | — | 14,174 |
| Larvae and nymphs Kg. | — | — | — | 2,145,500 | — | — | — | 2,145,500 |
| Ha. | — | — | — | 489 | — | — | — | 489 |
| Flame throwers, barriers, etc.:— | | | | | | | | |
| Adults Kg. | 5,665 | 1,295 | — | — | — | — | — | 6,960 |
| Ha. | — | 31 | — | — | — | — | — | 31 |
| Eggs Ha. | 346 | 2,156 | 29,891 | 3,109 | 20 | 24 | — | 35,546 |
| Larvae Kg. | — | — | 1,150,765 | — | — | — | — | 1,150,765 |
| Ha. | — | 247 | 4,340 | 1,659 | — | 15 | — | 6,261 |
| Nymphs Kg. | — | — | 4,157,357 | 65,900 | — | — | — | 4,223,257 |
| Ha. | — | — | 2,004 | 668 | — | — | — | 2,672 |

(a) Destroyed by plane:— 5,320,000 kg. over 680 ha.

(b) Destroyed by plane:— 709,000 kg. over 92 ha.

Amount destroyed by plane:— 6,029,090 kg. over 772 ha.

INDIA AND BURMA.

New Plant Diseases Recorded in 1939 *

Recorded in the Mycology Section of the Imperial Agricultural Research Institute, New Delhi:—

| | |
|---|--|
| <i>Zea mays</i> L. (Maize) | Root-rot caused by a species of <i>Pythium</i> at Sabour (Bihar). |
| <i>Musa</i> species (Banana) | Plant showing typical symptoms of 'bunchy top' caused by <i>Musa virus</i> 1. No experimental work was carried out. The disease is reported to be fairly wide-spread in Bihar. |
| <i>Solanum tuberosum</i> L. (Potato) | <i>Phytophthora parasitica</i> Dast. causing tuber rot and blight, at Simla. |
| <i>Lycopersicum esculentum</i> Mill. (Tomato) | <i>P. parasitica</i> Dast. causing fruit rot, at Simla. |
| <i>Solanum melongena</i> L. (Brinjal) | <i>P. parasitica</i> Dast. emended Ashby, causing fruit rot and leaf blight of young plants and seedlings, at Delhi. |

Recorded by A. C. TUNSTALL, Mycologist, Indian Tea Association, Tocklai Experimental Station, Cinnamara, Assam:—

| | |
|---------------------------------|---|
| <i>Camellia thea</i> Link (Tea) | Seedling wilt caused by a species of <i>Phomopsis</i> . |
|---------------------------------|---|

Recorded by M. J. NARASIMHAN, Deputy Director of Agriculture, Bangalore, Mysore:—

| | |
|---|--|
| <i>Oryza sativa</i> L. (Paddy) | A disease caused by eelworms, a species of <i>Tylenchus</i> . |
| <i>Piper betle</i> L. (Betel vine) and <i>Digitalis</i> | A disease caused by eelworms, <i>Caconema radicola</i> . |
| <i>Eucalyptus citriodora</i> Hook | A disease caused by bacteria, <i>Pseudomonas tumefaciens</i> Smith and Townsend. |

Recorded by S. R. BOSE, Professor of Botany, Carmichael Medical College, Calcutta:—

| | |
|--------------------------------|--|
| <i>Mikania scandens</i> Willd. | A leaf disease caused by <i>Cercospora mikaniae</i> Ell. and Ev. |
|--------------------------------|--|

* Communication from Mr. G. WATTS PADWICK, M. Sc., Ph. D., D. I. C., Imperial Mycologist, Imperial Agricultural Research Institute, New Delhi, India.

Recorded by S. P. AGHARKAR, Head of the Department of Botany, Calcutta University:—

Citrus chrysocarpa Lush (Kalimpong orange)

The following fungi isolated from decayed fruits were found to be capable of causing rotting:—

Penicillium expansum Link.

P. italicum Wehmer.

P. digitatum Sacc.

Aspergillus niger van Tieghem.

Cladosporium herbarum var. *citricola* Fawcett and Burger.

Trichoderma lignorum (Tode) Herz.

Colletotrichum gloeosporioides Penz.

Alternaria citri Pierce.

Botrytis cinerea Pers.

Fusarium moniliiforme Sheldon.

Spoilage of oranges by some, but not all, of these fungi has been reported before in India. *Penicillium italicum* Wehmer is a new record for India.

Recorded by L. N. SETH, Mycologist, Mandalay, Burma:—

Cajanus cajan (Linn.) Millsp. (Pigeon-pea)

Powdery mildew caused by *Oidium erysiphoides* Fr.

Recorded by K. M. THOMAS, Government Mycologist, Coimbatore, Madras:—

Elettaria cardamomum Maton and White (Cardamom)

Leaf-spot caused by a species of *Pestalozzia*.

Solanum melongena L. (Brinjal)

Little leaf disease caused by a virus.

It was successfully transmitted to a number of plants including tomato, tobacco, potato, and chilli.

Oryza sativa L. (Paddy)

'Mota' disease, which appears to be similar to the 'Senthal' disease of rice in Ceylon, causes considerable damage in Coorg.

Recorded in publish literature:—

Gossypium sp. (Cotton)

Stem breaking, caused by high winds.

Mangifera indica L. (Mango)

Twig blight and fruit rot of mango.

Phoma sp.

SOUTHERN RHODESIA.**Locust Invasion, 1932-1940 ***

Monthly Report No. 89. April, 1940.

Winged swarms of the red locust (*Nomadacris septemfasciata*, Serv.) have been reported during the month in the districts of Darwin, Mrewa, Mtoko, Hartley, Chibi, Ndanga and Melsetter (southern part).

Hoppers have been reported in most of the above districts and in addition, in the Salisbury, Marandellas, Charter, Gwelo, Lomagundi and Wankie districts. Apart from the districts of Mtoko, Mrewa, Chibi and southern Melsetter, the hatchings appear to have been relatively light, those in Salisbury and Marandellas districts having occurred only on the extreme boundaries and being almost negligible.

Action has been taken against the hoppers in all infested districts, spraying, baiting and beating down the bands having been adopted according to circumstances. A very large number of bands have been destroyed.

No damage to crops has been reported during the month.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany. — A Circular of March 11, 1940 of the Head of the Forestry Administration notifies to those concerned that the use of preparations made with copper salts should be reduced to a minimum in the control of plant diseases. As far as possible cupro-calcareous preparations should be utilized instead of copper sulphate. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, Anfang Juni 1940, 20. Jahrg., Nr. 6, S. 32).

*** An Amendment of March 26, 1940 to the Ordinance of October 8, 1937 [see this *Bulletin*, 1938, No. 2, pp. 28-29] relative to the control of potato wart disease [*Synchytrium endobioticum*] authorizes the cultivation of the varieties 'Allerfrüheste Gelbe' and 'Centifolia', non-resistant to wart disease, in 1941. Seedlings of these varieties can be sold up to July 1, 1941. (*Ämliche Pflanzenschutzbestimmungen*, Berlin, 1. April 1940, Bd. XII, Nr. 2, S. 24).

*** Ordinance No. 4/40 of March 29, 1940, modifies the regulations regarding trade in potatoes, regulations established by Ordinance of June 20, 1935 [see this *Bulletin*, 1935, No. 9, pp. 203-204]. A minimum diameter of 3.4 cm. for round varieties and 4.5 cm. for oblong varieties is fixed, measurements being taken at the greatest width of the potato. (*Ibid.*).

* Communication from the official correspondent of the Institute, Mr. RUPERT W. JACK, F. E. S., Chief Entomologist, Agricultural Laboratory, Department of Agriculture, Salisbury, Southern Rhodesia.

*** A Notice of the Corporation of Agriculture dated May 25, 1940, states that, despite war conditions, the measures adopted for the control of the Colorado beetle [*Leptinotarsa decemlineata*] will be continued in full force.

The 8th Decree of May 21, 1940 relative to the control of the Colorado beetle, with a view to relieving potato growers of this charge, anticipates the possibility of utilizing, if necessary, other persons for surveying work.

In the western areas of the country particularly susceptible to attack, control measures are organized by the Plant Protection Service, while in the region under supervision ('Überwachungsgebiet') which has extended considerably towards the East, the work of finding and destroying as soon as possible all new foci is carried out by a special organization for the control of the Colorado beetle ('Kartoffelabwehrdienst'). (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Nr. 6, S. 32.)

Germany (Protectorate of Bohemia and Moravia). — By Decree No. 133 of February 22, 1940, the Decree No. 167 of July 17, 1925 relative to the control of the potato wart disease (*Synchytrium endobioticum*) has been slightly modified. (*Sammlung der Gesetze und Verordnungen des Protektorates Böhmen und Mähren*, Prag, 20. April 1940, 43. Stück, S. 392).

Colombia. — Decree No. 352 of February 1940 lays down certain measures with a view to facilitating the development of phytosanitary campaigns and to extend the functions of the Provident Section of the Agricultural, Industrial and Mining Loan Bank. (*Diario Oficial*, Bogotá, 26 de febrero de 1940, año LXXV, núm. 24302, pág. 667).

*** Decree No. 438 of March 4, 1940, refers to the continuation of the campaign for the control of the Sigatoka disease [*Cercospora musae*]. (*Ibid.*, 8 marzo de 1940, núm. 24312, págs. 797 y 798).

United States of America. — Inspection of fruits and vegetables offered for entry from Newfoundland during the period since the promulgation of Notice of Quarantine No. 56 governing the importation of fruits and vegetables into the United States, effective on November 1, 1923, indicates that importation of fruits and vegetables from Newfoundland can be safely permitted on a basis comparable to those from Canada.

Amendment No. 1 to the rules and regulations supplemental to Notice of Quarantine No. 56, (as revised effective on December 1, 1936), approved on February 24, 1940 and effective on February 27, 1940, is made therefore to place the entry of fruits and vegetables from Newfoundland and its mainland territory of Labrador on the same status as those from Canada, with the exception of potatoes, which have long been and still are excluded from Newfoundland on account of potato wart [*Synchytrium endobioticum*]. (*B. E. P. Q. — Q. 56*, [Washington, D. C.], 1940, 3 pp.).

**. The coffee industry in Puerto Rico established early in the history of the Island has fortunately remained free from at least two of the world's most destructive coffee pests, the coffee berry borer (*Stephanoderes hampei*) and the coffee rust (*Hemileia vastatrix*).

The object of the Notice of Quarantine No. 73, approved on March 20, 1940 and effective on April 1, 1940, is to ensure the continued freedom of Puerto Rican coffee cultures from these and other coffee insects and diseases by prohibiting or restricting entry into the Island of those coffee materials which might be the means of introducing such pests.

Rules and regulations supplemental to the said Notice of Quarantine have been approved and are effective on the same dates. (*B. E. P. Q. — Q. 73*, [Washington, D. C.], 1940, 2 pp.).

Italy. — By Ministerial Decree of January 1, 1940, the control of the olive fly [*Dacus oleae*] by means of arsenical sprays has been made compulsory in the commune of Pisciotta, Province of Salerno, for the year 1940. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, Roma, 11 aprile 1940, anno XII, n. 11, pp. 535-536).

**. Ministerial Decree of March 15, 1940 authorizes hunting and capture of wild rabbits in the Province of Ravenna. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 23 marzo 1940, anno 81^o, n. 70, p. 1143).

**. Another Ministerial Decree of the same date authorizes the hunting and capture of these animals in the Provinces of Milan and Turin. (*Ibid.*, 25 marzo 1940, n. 71, pp. 1158-1159).

**. By Ministerial Circular No. 470 of March 26, 1940 the provincial Inspectorates of Agriculture are authorized to supervise and inspect experiments on the control of the downy mildew of the vine [*Plasmopara viticola*] and the peacock eye of the olive [*Cycloconium oleaginum*] using mixtures having a reduced copper content or mercurial preparations. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, 11 aprile 1940, n. 10, p. 548).

**. By Ministerial Decree of March 30, 1940, the control of the olive fly [*Dacus oleae*] by arsenical sprays has been made compulsory in the Provinces of Cagliari, Nuoro and Sassari for the year 1940. (*Ibid.*, 11 aprile 1940, n. 11, pp. 533-535).

**. With a view to preventing sparrows damaging early and very early wheats in particular, faculty has been given the administrators of different provinces to authorize the hunting and capture of these birds by any means. (*Giornale di Agricoltura della Domenica*, Roma, 2 giugno 1940, anno L, n. 22, p. 195).

Morocco (French Zone of). — By Order of March 29, 1940, the destruction of rabbits causing serious damage to crops and plantations in certain zones of the civil administrative area of Rabat-banlieue (environs) is authorized. (*Bulletin Officiel*, Rabat, 12 avril 1940, XXIX^e année, n^o 1433, p. 371).

New Zealand. — By special order made by the Papakura Borough Council of February 26, 1940 and published by the Minister of Agriculture on March 29, 1940 all the plants mentioned in the Second Schedule of the Noxious Weeds Act, 1928 are declared to be noxious weeds within the Papakura Borough. (*The New Zealand Gazette*, Wellington, April 4, 1940, Numb. 30, p. 654).

Paraguay. — Decree No. 165 of March 5, 1940 adds to the list of agricultural pests of the country the weevil *Conotrachelus denieri* harmful to cotton. (*Gaceta Oficial de la República del Paraguay*, Asunción, marzo 6 de 1940, núm. 4, pág. 11).

Uruguay. — By Decree of February 21, 1940, the three citrus diseases known as 'lepra explosiva', 'clorosis zonada' and 'psorosis' are declared pests of national agriculture. (*Diario Oficial de la República Oriental del Uruguay*, Montevideo, 29 de febrero de 1940, tomo 138, núm. 10045, pág. 335-A).

RECENT BIBLIOGRAPHY

AKAI, Shigeyasu. On the ash figures of leaves of the rice plants transplanted from the different kinds of nursery beds and their susceptibilities to the blast disease. *Annals of the Phytopathological Society of Japan*, Tôkyô, 1939, Vol. IX, No. 4, pp. [223]-235. [Bibliography], p. 235.

[In Japanese, with title and summary also in English. — *Piricularia oryzae*].

ALEKSANDROVSKAIA-IVANOVA, Z. V. The application of vivianite for the control of granary pests. *Plant Protection*, Leningrad, 1939, No. 19, pp. 37-[47]. [Literature], p. [47].

[In Russian, with title and summary also in English].

ALVARADO, Juan Antonio. Los insectos dañinos y los insectos auxiliares de la agricultura en Guatemala. Primera edición. Guatemala, Tipografía Nacional, 1939, 301 págs., 143 figs. Literatura citada, págs. 293 a 295.

ANDERSON, P. J. Control of tobacco mildew (blue mold) in seedbeds. *Connecticut Agricultural Experiment Station. Circular 128*, New Haven, 1939, 5 pp., 2 figs. [*Peronospora tabacina*].

APPEL, O., und RIEHM, E. Der Brand des Hafers und seine Bekämpfung. *Biologische Reichsanstalt für Land- und Forstwirtschaft. Flugblatt Nr. 38*. Achte Auflage. Berlin 1940, 4 S., 6 Abb. [*Ustilago avenae*, *U. levis*].

ARCHANGELSKI, E. P. On the distribution of the wheat nematode in the Kirghiz SSR. *Plant Protection*, Leningrad, 1939, No. 19, pp. 163-166. [In Russian, with title also in English. — *Anguillulina tritici*].

ARION, Georges. L'état actuel de la lutte contre le doryphore en Roumanie. XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 10-12, 1 carte. [*Leptinotarsa decemlineata*].

ATHERTON, D. O. White grubs and pasture deterioration on the Atherton Tableland. *Queensland Agricultural Journal*, Brisbane, 1939, Vol. LII, Pt. 5, pp. 484-522, pls. 226-231. Bibliography, p. 514.
[*Lepidiota caudata*].

BARBER, G. W. Hibernation of the corn ear worm in southern Connecticut. *Connecticut Agricultural Experiment Station. Bulletin 419*, New Haven, 1939, 27 pp.
[*Heliothis obsoleta*].

BENLLOCH, Miguel. El «mal del corazón» de la remolacha. *Ministerio de Agricultura. Dirección General de Agricultura. Sección de Plagas del Campo. Servicio Fitopatológico Agrícola*, Madrid, 1940, 7 págs., 1 fig. Bibliografía, págs. 6 y 7.
[A disorder caused by boron deficiency in soil].

[BIOLOGISCHE REICHSANSTALT FÜR LAND- UND FORSTWIRTSCHAFT IN BERLIN-DAHLEM]. Anleitung zur Bestimmung und Bewertung der wichtigsten Schädigungen der Kulturpflanzen. I. Ackerbau. 6. Auflage. Berlin 1939, 70 S., 37 Abb., 2 Taf.

[BIOLOGISCHE REICHSANSTALT FÜR LAND- UND FORSTWIRTSCHAFT IN BERLIN-DAHLEM]. Anleitung zur Bestimmung und Bewertung der wichtigsten Schädigungen der Kulturpflanzen. II. Gemüse- und Obstbau. 3. Auflage. Berlin 1939, 95 S., 57 Abb.

BIRAGHI, A[ntonio]. Osservazioni e considerazioni su "Tuberculina Sbrozzii" Cav. et Sacc. associata a "Puccinia vincae" Berk. *Bollettino della R. Stazione di Patologia vegetale* [di Roma], Firenze, 1940, anno XX, n. s., n. 1, pp. 71-80, figg. 1-5.

BLATNÝ, Ctibor. Détermination et appréciation des régions productrices de pommes de terre pour semailles dans le Protectorat de Bohême et Moravie, en particulier du point de vue des maladies à virus. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939*. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 25-28, 1 carte.

BONDAR, Gregorio. Dois Cerambicideos novos da Bahia. *A Bahia Rural*, Bahia-Brasil, 1939, ano VI, ns. 63 e 64, págs. 54 e 56. Bibliografía, pag. 56.
[*Adesmus borgmeieri* n. sp. on *Ceiba pentandra*; *Gryllica melzeri* n. sp. on *Coccoloba ilheensis*].

BONDAR, Gregorio. Sobre alguns insetos nocivos ás Anonaceas frutíferas na Bahia e descrição de um novo Curculionídeo. *A Bahia Rural*, Bahia-Brasil, 1939, ano VI, ns. 65 e 66, págs. 94-95.
[A description is given, *inter alia*, of the new species *Prionopus anonicola* harmful to the leaves of *Anona squamosa*].

BRAUN, H., [und] RIEHM, E. Die wichtigsten Krankheiten und Schädlinge der landwirtschaftlichen und gärtnerischen Kulturpflanzen und ihre Bekämpfung. Für Praxis und Studium. Vierte, erweiterte und neubearbeitete Auflage. Berlin, Verlag von Paul Parey, 1940, 270 S., 194 Abb. (Deutscher Landbau. Lehrbuchreihe des Forschungsdienstes [Reichsarbeitsgemeinschaften der Landwirtschaftswissenschaft]).

[These two scientists have collaborated in preparing a new edition of the well-known book of Dr. Riehm on crop diseases and their control; the third edition of this volume appeared in 1927.

The title of the new edition, enlarged and improved, was modified as besides the chief diseases and pests of agricultural plants those of horticultural plants and the relative control measures are also included.

Particular importance has been given to the diseases and pests of fruit trees and grapes. The section on oil-yielding and textile plants has been considerably enlarged.

Another improvement in this fourth edition is that the description of the chief parasites is followed by useful bibliographical references.

The many illustrations are exceptionally well executed].

- BREIDER, Hans. Untersuchungen zur Vererbung der Widerstandsfähigkeit von Weinreben gegen die Reblaus, *Phylloxera vastatrix* Planch. I. Das Verhalten von F₂-Generationen, die aus Selbstungen von widerstandsfähigen und anfälligen F₁-Artbastarden gewonnen wurden. *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 1, S. [145]-168, Abb. 1-14. Schrifttum, S. 168.
- BROWN, C. Walkden. Johnson grass troublesome on lucerne flats. Eradication and control methods. *The Agricultural Gazette of New South Wales*, Sydney, 1939, Vol. L, Pt. 11, pp. 595-598, 603, 4 figs. [*Sorghum halepense*].
- CALVINO, Mario. Considerazioni sui danni delle gelate di quest'inverno. *La Costa Azzurra Agricola Floreale*, Sanremo, 1940, anno XX, nn. 5-6, pp. 55-57.
- CARNEIRO, João Gonçalves, e PICKEL, D. Bento. Catálogo das bacterias e dos fungos do caféiro. *Secretaria da Agricultura, Industria e Comercio do Estado de São Paulo. Diretoria de Publicidade Agricola*. São Paulo, 1940, 184 pags. [An annotated list of bacteria and fungi observed on coffee in different countries].
- CHABOUSSOU, F. Observations sur le Carabique *Lebia grandis* Hentz, prédateur et parasite du doryphore. *Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences*, Paris, 1939, p. [127]-130. [*L. grandis* and *Leptinotarsa decemlineata*].
- CHIARUGI, Alberto. L'eredità in Patologia vegetale. *IV Congresso internazionale di Patologia comparata*. Roma, 15-20 maggio 1939. [Milano, 1939], I vol.: Relazioni, pp. [155]-210. [With summaries in German, English, Spanish, French and Italian].
- CHIESA MOLINARI, O. Tisanópteros (Trips) más comunes que atacan las plantas cultivadas en Argentina. *Boletín de Agricultura y Ganadería*, Córdoba, 1939, n.º 174, págs. 8 a 17, figs. 1-9. Bibliografía consultada y citada, pág. 17. [*Thrips tabaci*, *Hercothrips fasciatus*, *Heliothrips haemorrhoidalis*, *Taeniothrips inconsequens*, *T. simplex*, *Frankliniella insularis*].
- CHRISTOFF, Michail A. Untersuchungen über die Kältefestigkeit der Wintergerste. *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 1, S. [47]-90, Abb. 1-3. Schrifttum, S. 90.
- COSTANTINO, Giorgio. Degli insetti parassiti della rosa e di un Coleottero, *Labi-dostomis taxicornis* Fabr., dannoso ai fiori. *La Costa Azzurra Agricola Floreale*, Sanremo, 1940, anno XX, nn. 3-4, pp. 29-32, 4 figg.; nn. 5-6, pp. 58-62. Lavori consultati, pp. 59-62.
- COTTIER, W. Work on insecticides against the cabbage white butterfly, *Pieris rapae* L. *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 1 A, pp. 23 A-45 A. References, p. 45 A.
- COTTIER, W., and CLARK, P. J. Arsenical and lead residues on cabbages. *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 1 A, pp. 14 A-23 A. References, p. 23 A.
- COUTURIER, A. Observations biologiques sur *Podisus maculiventris* Say, ennemi naturel du doryphore. *Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences*. Paris, 1939, p. [131]-133. [*P. maculiventris* and *Leptinotarsa decemlineata*].
- DE BRUYN, Helena L. G. Marsh spot, a necrotic disease of pea-seed, caused by Mn-deficiency. *IV Congresso internazionale di Patologia comparata*. Roma, 15-20 maggio 1939. [Milano, 1939], II vol.: Atti e comunicazioni, pp. [373]-374.
- DE LAPPARENT, P. Le doryphore et les insecticides. *Comité des Travaux Historiques et Scientifiques, Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences*, Paris, 1939, p. [135]-139. [*Leptinotarsa decemlineata*].
- DESHUSSES, Louis, et DESHUSSES, Jean. Dosage du fluosilicate de baryum dans les insecticides. *Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene. Travaux de Chimie alimentaire et d'Hygiène*, Bern 1940, Bd. XXXI, Heft 1/2, S. 62-65.

- DIAZ DE MENDIVIL, José M. Les maladies de dégénérescence et les possibilités d'amélioration de la culture des pommes de terre en Espagne. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939.* Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 35-39.
- DIEHL, R. Les maladies de dégénérescence chez les plantes cultivées et spécialement chez la pomme de terre. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939.* Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 45-50. [In France].
- DREES. Ein Marienkäfer (*Adalia bipunctata*) als Stachelbeerschädling. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1940, 20. Jahrg., Nr. 6, S. 30.
- DUFRENOY, J. Etudes cytologiques de tissus végétaux affectés par des virus. *IV Congresso internazionale di Patologia comparata. Roma, 15-20 maggio 1939.* [Milano, 1939], II vol.: Atti e comunicazioni, pp. [379]-381, figg. 1-4.
- DUFRENOY, J., REED, H. S., et SEMPLO, C. Dégénérescence lipidique dans les cellules végétales. *IV Congresso internazionale di Patologia comparata. Roma, 15-20 maggio 1939.* [Milano, 1939], II vol.: Atti e comunicazioni, pp. [383]-384.
- FALKENSTEIN, B. J. Testing baryum-arsenate for the control of mouse-like rodents. *Plant Protection, Leningrad, 1939, No. 19, pp. 29-[36].* [In Russian, with title and summary also in English. — *Microtus arvalis*].
- FEYTAUD, [Jean]. Les progrès du doryphore en Europe. *Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences.* Paris, 1939, p. [109]-112. [*Leptinotarsa decemlineata*].
- FEYTAUD, [Jean]. Les problèmes soulevés par l'invasion doryphorique. *Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences.* Paris, 1939, p. [113]-116. [*Leptinotarsa decemlineata*].
- FEYTAUD, [Jean]. Les insectes de la vigne dans le Sud-Ouest de la France. *Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences.* Paris, 1939, p. [141]-145.
- FISH, S. Tomato diseases and their control. *The Journal of the Department of Agriculture, Victoria, Australia, Melbourne 1939, Vol. XXXVII, Pt. 8, pp. 378-391, 28 figs. References, p. 391.* [*Phytophthora cryptogea*, *Pythium de baryanum*, *Rhizoctonia solani*, *Colletotrichum atramentarium*, *Verticillium albo-atrum*, *Fusarium lycopersici*, *Sclerotinia*, virus diseases (spotted wilt, mosaic, streak, blue top, rosette or big bug), *Heterodera marioni*, *Phyllocoptes lycopersici*, *Septoria lycopersici*, *Macrosporium solani*, *Phyt. infestans*, *Cladosporium fulvum*, *Phytophthora michiganensis*, blossom end rot (a non-parasitic disease), sun scald, *Bacterium punctulans*, *B. tryptis*].
- GABOTTO, L[ui]gi. Le economie nei trattamenti antiperonosporici. *Il Coltivatore e Giornale Vinicolo Italiano*, Casale Monf., 1940, anno 86^o, n. 8, pp. 87-89. [*Plasmopara viticola*].
- GARDNER, C. A. A record of a new noxious weed, and a warning to farmers and settlers. *Rapistrum weed (Rapistrum rugosum (L.) All.)*. *Journal of the Department of Agriculture of Western Australia, Perth, 1939, Vol. 16 (Second Series), No. 4, pp. 441-444, 1 fig., 1 pl.*
- GARMAN, Philip, and TOWNSEND, J. F. The European red mite and its control. *Connecticut Agricultural Experiment Station. Bulletin 418, New Haven, 1938, 34 pp., 6 figs. Partial bibliography, p. 34.* [*Paratetranychus pilosus*].
- GAROGLIO, Pier Giovanni. Il risparmio del rame negli usi agricoli. *L'Italia Agricola, Roma, 1940, anno 77, n. 5, pp. [329]-333.*

- GIGANTE, Roberto. Les maladies de dégénérescence chez les plantes cultivées et spécialement chez la pomme de terre. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 55-60. [In Italy].
- GOFFART, H. Die Verwendung von Chlorpikrin bei der Nematodenbekämpfung. *Anzeiger für Schädlingskunde*, Berlin 1939, XV. Jahrg., Heft 11, S. [121]-125, Abb. 1. Schrifttum, S. 124-125.
- GOIDANICH, Athos. Precisazioni necessarie. Allarme per il deperimento del sorgo zuccherino. *Giornale di Agricoltura della Domenica*, Roma, 1940, anno L, n. 28, p. 240. [The author reports serious attacks of *Rhopalosiphum graminum* observed in 1940 on the Paduan plain, but adds that despite this infestation, sugar sorghum has shown renewed growth and will reach complete maturity].
- GORLENKO, M. V. The age resistance of Thatcher wheat to brown rust. *Plant Protection*, Leningrad, 1939, No. 19, pp. 166-170. [Literature], p. 170. [In Russian, with title also in English. — *Puccinia triticina*].
- GOTO, K. *Sclerotinia Libertiana* on buckwheat. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 4, pp. [263]-265, figs. 1-3. [Bibliography], p. 265. [In Japanese, with title also in English].
- GRISON, P. Caractères de la résistance au doryphore, *Leptinotarsa decemlineata* Say, d'un hybride *Solanum damisum* × *Solanum tuberosum*. Comité des Travaux Historiques et Scientifiques. *Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences*. Paris, 1939, p. [121]-125, 1 fig.
- HASE, Albrecht. Über den Pinienprozessionsspinner und über die Gefährlichkeit seiner Raupenhaare. (*Thaumetopoea pityocampa* Schiff.). *Anzeiger für Schädlingskunde*, Berlin 1939, XV. Jahrg., Heft 12, S. [133]-142, Abb. 1-11. Literaturverzeichnis, S. 142.
- HATTORI, T., and TAMURA, T. On the effect of electricity upon the growth of wood-destroying fungi. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 4, pp. [211]-222, figs. 1-7. [Bibliography], p. 221. [In Japanese, with title and summary also in English. — *Poria vaporaria*, *Polystictus sanguineus*, *Schizophyllum commune*].
- HEMMI, Takewo, and AKAI, Shigeyasu. Pathological studies on *Polyporus rhodophacus* Lév. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 4, pp. [199]-210, figs. 1-13, pl. IV. [In Japanese, with title and summary also in English].
- HEPTING, George H. A vascular wilt of the mimosa tree (*Albizia julibrissin*). *United States Department of Agriculture. Circular No. 535*, Washington, D. C., 1939, 10 pp., 2 figs. [*Fusarium perniciosum* n. sp. A Latin diagnosis of the new species is given].
- HIGH, M. M. The vegetable weevil. *United States Department of Agriculture. Circular No. 530*, Washington, D. C., 1939, 25 pp., 12 figs. Literature cited, p. 25. [*Listroderes obliquus*].
- HILL, R. P. Eradication of blackberry. Valuable work done by goats in ridding land of this pest. *The New Zealand Journal of Agriculture*, Wellington, 1939, Vol. 59, No. 5, pp. 401-403, 6 figs. [*Rubus fruticosus*].
- HOFMANN, Christoph, and DAUBERSCHMIDT, Karl. Freilandversuche mit einem neuen Berührungsgift gegen die Nonne (*Lymantria monacha* L.). *Forstwissenschaftliches Centralblatt*, Berlin 1939, 61. Jahrg., Heft 22-24, S. [605]-616. Schrifttum, S. 616.
- HOVY, J. W. H. Oligodynamic control of eelworm (*Heterodera marioni*). *Nature*, London, 1939, Vol. 144, No. 3650, p. 672.
- HUTSON, J. C. A note on the cardamom weevil (*Prodiocetes haematicus* Chev. var.). *The Tropical Agriculturist*, Peradeniya, Ceylon, 1939, Vol. XCIII, No. 5, pp. 281-283, 1 pl.

- HYNES, H. J., and WILSON, R. D. Fungicidal treatment of pea seed. Beneficial results from dusting. *The Agricultural Gazette of New South Wales*, Sydney, 1939, Vol. L, Pt. 12, pp. 657-659, 1 fig. References, p. 659.
- IBATULINA, F. S. Testing methods for controlling the garden weevil. *Plan Protection*, Leningrad, 1939, No. 19, pp. 74-[92], figs. 1-2. [Literature], pp. [91]-[92]. [In Russian, with title also in English. — *Rhynchites*].
- JANNONE, Giuseppe. Studio morfologico, anatomico e istologico del *Dociostaurus maroccanus* (Thunb.) nelle sue fasi *transiens congregans*, *gregaria* e *solitaria*. (Terzo contributo). *Bollettino del R. Laboratorio di Entomologia Agraria di Portici*, Portici, 1940, vol. IV, pp. [3]-443, figg. I-CL. Bibliografia, pp. 423-436.
- JOHNSON, James, and OGDEN, William B. Tobacco mosaic and its control. *Agricultural Experiment Station. University of Wisconsin. Bulletin 445*, Madison, 1939, 22 pp., 8 figs.
- JORDAN, K., und HERING, E. M. (Herausgegeben von). VII. Internationaler Kongress für Entomologie. Verhandlungen. Band III. Im Selbstverlage der Internationalen Kongresse für Entomologie. Weimar, Druck von G. Uschmann, 1939, S. [1425]-2276, Taf. 162-243, 5 Textabb.
[For the second volume of the Proceedings of the Seventh International Entomological Congress, see this *Bulletin*, 1940, No. 2, p. 42.
This third volume contains the text of the general and special reports relative to medical and veterinary entomology, apiculture and sericulture, forest entomology and to the biology and control of cockchafer (*Melolontha*)].
- JORDAN, K., und HERING, E. M. (Herausgegeben von). VII. Internationaler Kongress für Entomologie. Verhandlungen. Band IV. Im Selbstverlage der Internationalen Kongresse für Entomologie. Weimar, Druck von G. Uschmann, 1939, S. [2277]-3130, Taf. 244-294, 100 Textabb.
[This fourth volume comprises the reports presented to the sections on wine-growing, fruit cultivation, and horticulture; field and garden crops; research on the Colorado beetle (*Leptinotarsa decemlineata*); insects affecting stored products; control measures, natural protection and also education in entomology].
- JORDAN, K., und HERING, E. M. (Herausgegeben von). VII. Internationaler Kongress für Entomologie. Band V: Kongressbericht. Im Selbstverlage der Internationalen Kongresse für Entomologie. Weimar, Druck von G. Uschmann, 1940, S. [I]-CCXI, IV, Taf. 1-VII.
[This fifth volume supplements very satisfactory the Proceedings of the important Congress which took place at Berlin in 1938].
- JUNCU, Vasile. Les méthodes modernes de lutte contre le mildiou (*Plasmopara viticola*) et la teigne des raisins (*Clysia ambiguella* Hübn. et *Polychrosis botrana* Schiff.). *XVIII^e Congrès international d'Agriculture*, Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 58-62. [In Rumania].
- KAMENSKI, S. A., and MENDE, V. N. Effect of temperature and moisture on the development of the beet weevil. *Plant Protection*, Leningrad, 1939, No. 19, pp. [3]-[28], figs. 1-4. [Literature], p. [28].
[In Russian, with title also in English. — *Bothynoderes punctiventris*].
- KASTON, G. J. The native elm bark beetle, *Hylurgopinus rufipes* (Richhoff), in Connecticut. *Connecticut Agricultural Experiment Station. Bulletin 420*, New Haven, 1939, 39 pp., 19 figs. Bibliography, pp. 38-39.
- KAWAMURA, T. A list of the bacteria and fungi imported and transported under permit into Japan proper 1914-1938. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 4, pp. [243]-262.
[In Japanese, with title also in English].
- KLAPP, E. La lutte contre la dégénérescence de la pomme de terre en Allemagne. *XVIII^e Congrès international d'Agriculture*, Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 15-19.

- KÖHLER, E. Les maladies de dégénérescence chez les plantes cultivées et spécialement chez la pomme de terre. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939.* Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 20-25, fig. 1-4, 1 carte. [In Germany].
- KRUEL, Walthar. Wie verhält sich der Messingkäfer in erhitzter Luft? *Mitteilungen der Gesellschaft für Vorratsschutz E. V., Berlin-Steglitz, Berlin 1940, 16. Jahrg., Nr. 3, S. 33-35.* [Niptus hololeucus].
- LAPINA, V. F. Dependence of storage periode of *Trichogramma evanescens* Westw. upon temperature and humidity. *Plant Protection, Leningrad, 1939, No. 19, pp. 67-73.* [Literature], pp. 72-73. [In Russian, with title and summary also in English].
- LEISHMAN, E. Brown rot (*Sclerotinia fructicola*) of stone fruit. *The Journal of the Department of Agriculture of South Australia, Adelaide, 1939, Vol. XLIII, No. 3, pp. 196-201, 6 figs.*
- LEUZINGER, Hans. La lutte contres les gels printaniers du vignoble suisse. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939.* Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 63-70, fig. 1-6.
- LOCKE, S. B., RIKER, A. J., and DUGGAR, B. M. Production of growth substance on peptone broth by crown gall bacteria and related nongall-forming organisms. *Journal of Agricultural Research, Washington, D. C., 1939, Vol. 59, No. 7, pp. 519-525.* Literature cited, pp. 524-525. [*Phytoplasma tumefaciens, Bacillus radiobacter*].
- LOCKE, S. B., RIKER, A. J., and DUGGAR, B. M. The nature of growth substance originating in crown gall tissue. *Journal of Agricultural Research, Washington, D. C., 1939, Vol. 59, No. 7, pp. 535-539.* Literature cited, pp. 538-539. [*Phytoplasma tumefaciens*].
- MACOLA, Tulio. Algunas indicaciones sobre modalidades y medios de lucha contra el "gusano del duraznero" (*Laspeyresia molesta*, Busck). *Boletín de Agricultura y Ganadería, Córdoba, 1939 n^o 174, págs. 31 a 34, 1 fig.*
- MALENOTTI, Ettore. Méthodes modernes de lutte contre les ennemis de la vigne: organisation, moyens, appareils et machines. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939.* Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 44-49. [In Italy].
- MAMELI CALVINO, Eva. Nemici in vista: *Doryphora decemlineata* e *Diabrotica undecimpunctata*. *La Costa Azzurra Agricola Floreale, Sanremo, 1940, anno XX, nn. 5-6, pp. 52-53.*
- MANTJ, P. Où en est le problème de la nature des ultravirus? *Bulletin de la Société Royale de Botanique de Belgique, Gembloux, 1939, tome LXXII, 2^{ème} sér., tome XII, fasc. 1, p. [22]-29.*
- MANNINGER, G. Adolf. Adatok a lucernabimbógubacslégy (*Contarinia medicaginis*) biológiájához, különös tekintettel a lucernamagtermesztésre. *Mezőgazdasági Kutatások, Budapest 1940, XIII. évf., 4. sz., 97-102. o., 1-3. ábra.* Szakirodalom, 102. o. [In Hungarian, with title and summary also in German:— 'Die Biologie und die Bekämpfung der Luzerneblütengallmücken'].
- MARIE, Victor. El cultivo del algodón en el Calle de Cafete, en relación con las plagas entomológicas, en 1939. *Ministerio de Fomento. Dirección de Agricultura y Ganadería. Instituto de Altos Estudios Agrícolas del Perú. Estación Experimental Agrícola de La Molina. Informe No. 51, Lima-Perú, 1939, 31 págs.*
- MARSAIS, Paul. Méthodes modernes de lutte contre les ennemis de la vigne: organisation, moyens, appareils et machines. *XVIII^e Congrès international d'Agriculture, Dresden, 6-12 juin 1939.* Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 35-39. [In France].

- MARTÍNEZ-ZAPORTA, Moisés. Méthodes modernes de lutte contre les ennemis de la vigne: organisation, moyens, appareils et machines. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939*. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 31-35.
[In Spain].
- MCCLEERY, F. C. Black spot of citrus. A brief summary of control experiments, 1925-29. *The Agricultural Gazette of New South Wales*, Sydney, 1939, Vol. L, Pt. II, pp. 618-422, 4 figs.
[*Phoma citricarpa*].
- MEHL, Sigbert. Wie wirkt der Frost auf die Raupe der Heumotte (*Ephestia elutella* Hb.)? *Mitteilungen der Gesellschaft für Vorratsschutz E. V. Berlin-Steglitz*, Berlin 1940, 16. Jahrg., Nr. 3, S. 31-32.
- MEIER, N. F. The predacious mite *Pediculoides ventricosus* Newp. *Plant Protection*, Leningrad, 1939, No. 19, pp. 150-153, figs. 1-4. [Literature], pp. 152-153.
[In Russian, with title also in English].
- MORRISON, Harold. Taxonomy of some scale insects of the genus *Parlatoria* encountered in plant quarantine inspection work. *United States Department of Agriculture. Miscellaneous Publication No. 344*, Washington, D. C., 1939, 34 pp., 11 pls. Literature cited, pp. 31-34.
[*Parlatoria banksiae* (Maskell), *P. blanchardi* (Targioni Tozzetti), *P. camelliae* Comstock, *P. cinerea* Hadden, *P. crotonis* Douglas, *P. fulleri* (a new name for *P. viridis* Fuller), *P. oleae* (Colvée), *P. pergandii* Comstock, *P. pittospori* Maskell, *P. proteus* Curtis, *P. theae* Cockerell, *P. zizyphus* (Lucas)].
- MULFORD, Furman Lloyd, and WEISS, Freeman. Culture and diseases of delphiniums. *U. S. Department of Agriculture. Farmers' Bulletin No. 1827*, Washington, D. C., 1939, 11 pp., 4 figs.
[*Sclerotium rolfsii*, *Bacterium delphinii*, *Erysiphe polygoni*, *Diaporthe arctii*, mosaic, damping-off].
- MÜLLER, Gerhard. Untersuchungen über die Kältefestigkeit von Pflaumensorten. *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 1, S. [91]-144, Abb. 1-21, 2 gr. Darst. Schrifttum, S. 144.
- MÜLLER, K. O. Über die Abbauresistenz der Kartoffel und die Züchtung abbaufester Kartoffelsorten. *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 1, S. 1-19, Abb. 1-11. Schrifttum, S. 19.
- NAUMOV, N. A. A brief survey of the attainments of Soviet phytopathology. *Plant Protection*, Leningrad, 1939, No. 19, pp. 108-[119].
[In Russian, with title also in English].
- NICOLAS, G[ustave]. Sur l'extension de *Diaspis pentagona* Targ. en France. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1939, tome XXV, n^o 26, p. 1120-1121.
- PACKARD, C. M., and CARTWRIGHT, W. B. The Hessian fly in Indiana. *Purdue University Agricultural Experiment Station. Bulletin No. 440*, Lafayette, Indiana, 1939, 15 pp., 5 figs.
[*Phytomyza destructor*].
- PASINETTI, L[auro]. Ricerche sulla attività metabolica propria dei tessuti neoplastici da "B. tumefaciens" Smith et Townsend. *Rivista di Patologia Vegetale*, Pavia, 1940, anno XXX, nn. 5-6, pp. [173]-203, 1 fig. Bibliografia, pp. 202-203.
[*Bacterium tumefaciens*].
- PAWLAKOS, Jannis. *Rhaphidopalpa foveicollis* Luc., als Melonenschädling in Griechenland und seine Bekämpfung. (Vorläufige Mitteilung). *Anzeiger für Schädlingskunde*, Berlin 1939, XV. Jahrg., Heft 11, S. 130.
- PERCHER, G. Essais sur quelques mouillants agricoles. *Annales des Epiphyties et de Phyto-génétique*, Paris, 1939, nouv. sér., tome V, fasc. 4, p. [565]-575, fig. 1-3.
- PEROTTI, Renato. *Biologia vegetale applicata all'agricoltura*. III. Micologia. *Malattie parassitarie*. 2^a edizione. Torino, Rosenberg & Sellier, 1940, XII + 1191 pp., 401 figg. Prezzo: L. 260.
[In this important volume, the material is treated much more fully and completely than in other treatises on plant pathology both as regards reviewing and documentation.]

The study of determinism, environmental and subjective, is given a predominant place, with criticisms on pathogenesis.

Particular attention has been given to the very numerous illustrations, mostly original.

In the extensive bibliography, Italian studies and works on phytopathology are well in evidence].

PESCOTT, R. T. M. The Argentine ant (*Iridomyrmex humilis* Mayr). *The Journal of the Department of Agriculture of Victoria*, Melbourne, 1939, Vol. XXXVII, Pt. 12, pp. 561-562, 586, 3 figs. References, p. 586.

PETRI, L[ionello]. Rassegna dei casi fitopatologici osservati nel 1939. *Bollettino della R. Stazione di Patologia vegetale* [di Roma], Firenze, 1940, anno XX, n. s., n. 1, pp. 1-70, figg. 1-12.

[In Italy and in some regions of Italian East Africa].

PETRI, L[ionello]. Processi regressivi nelle piante. *IV Congresso internazionale di Patologia comparata*, Roma, 15-20 maggio 1939. [Milano, 1939], I vol.: Relazioni, pp. [459]-507. Bibliografia, pp. 500-507.

[With summaries in German, English, Spanish, French and Italian].

PIEGLER, Hanns. Deutsche Forschungsstätten im Dienste der Nahrungsfreiheit. Ein Handbuch im Auftrage des Forschungsdienstes. Neudamm, Verlag J. Neumann, 1940, 486 S., 1 Karte. Preis RM. 26.

[Report is also made of the German organizations engaged in the study and control of plant diseases and pests].

POISSON, R., et PATAY, R. A propos des éléments figurés du sang du doryphore, *Leptinotarsa decemlineata* Say (Coléoptère Chrysomélide). *Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences*. Paris, 1939, p. [101]-108, fig. 1. Bibliographie, p. 107-108.

POSPELOV, V. P. Use of diseases of insects as a method of controlling agricultural pests. *Plant Protection*, Leningrad, 1939, No. 19, pp. [93]-[107], figs. 1-9. [Literature], pp. 106-[107].

[In Russian, with title also in English].

PRÉVOST, Bénédict. Memoir on the immediate cause of bunt or smut of wheat, and of several other diseases of plants, and on preventives of bunt. Translated from the French by George Wannamaker Keitt. With a foreword, bibliographical sketch, and evaluation of the memoir by the translator. Menasha, Wis., American Phytopathological Society, 1939, 95 pp., 3 pls. (Phytopathological Classics, No. 6).

[An English translation of 'Mémoire sur la cause immédiate de la carie ou charbon des blés, et de plusieurs autres maladies des plantes, et sur les préservatifs de la carie' published in 1807 at Paris by Bénédict Prévost.

The translator states that this work contains the first recorded adequate experimental demonstration and interpretation of the rôle of a microorganism in the causation of a disease. It establishes one of the most fundamental and fruitful scientific concepts and lays a firm foundation for the later and more generalized germ theory of disease. The Memoir contains many other contributions of outstanding merit, but this alone entitles it to recognition as one of the most significant pioneer works in the field of biology].

PROVAGLIO, G. Verso il meglio nella lotta contro le grillotalpe. *Bullettino dell'Agricoltura*, Milano, 1940, anno 74^o, n. 26, p. [1].

[*Gryllotalpa*].

PŠTROSS, Friedrich. Rationalisation et organisation de la lutte contre les ennemis de la vigne. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 27-31. [In the Protectorate of Bohemia and Moravia].

QUANJER, [H. M.]. Die Bedeutung der regressiven Gewebeveränderungen für die Diagnose der Pflanzenkrankheiten. *IV Congresso internazionale di Patologia comparata*, Roma, 15-20 maggio 1939. [Milano, 1939], I vol.: Relazioni, pp. [509]-515.

[With summaries in German, English, Spanish, French and Italian].

- QUANJER, H. M. A comparative study of the virus and deficiency diseases of the potato plant. *IV Congresso internazionale di Patologia comparata*. Roma, 15-20 maggio 1939. [Milano, 1939], II vol.: Atti e comunicazioni, pp. [385]-387.
- RANKY, Sandor, et SÁNTHA, László. La lutte moderne contre les parasites de la viticulture: organisation, moyens, ustensiles et machines. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux. p. 39-43. [In Hungary].
- RATCLIFFE, F. N., and CUMMINS, J. E. Termite (white ant) research in Australia. *The Empire Forestry Journal*, London, 1939, Vol. 18, No. 2, pp. 221-228.
- RIEHM, E. Bekämpfung der Pflanzenschädlinge. *Wochenblatt der Landesbauernschaft Schleswig-Holstein*, Kiel 1940, Jahrg. 7, Folge 25, S. [485].
- RITCHER, P. O. The strawberry crown borer, *Tyloclerina fragariae* (Riley). *Kentucky Agricultural Experiment Station. University of Kentucky. Bulletin No. 389*, Lexington, Kentucky, 1939, 35 pp., 11 figs. References, p. 35.
- RIVERA, V[incenzo]. Influenze ambientali sulla comparsa e sullo sviluppo di malattie da virus nei vegetali. *IV Congresso internazionale di Patologia comparata*. Roma, 15-20 maggio 1939. [Milano, 1939], II vol.: Atti e comunicazioni, pp. [367]-368, 1 fig.
- RIVERA, V[incenzo]. L'arresto o il rallentamento del metabolismo come condizione necessaria e sufficiente di predisposizione al contagio crittogamico in piante di varietà recettive. *IV Congresso internazionale di Patologia comparata*. Roma 15-20 maggio 1939. [Milano, 1939], II vol.: Atti e comunicazioni, pp. [369]-371.
- RIVERA, V[incenzo]. La influenza dei metalli (azione di presenza) sulla eccitazione e depressione della moltiplicazione cellulare in tessuti normali e patologici vegetali ed animali. *IV Congresso internazionale di Patologia comparata*. Roma, 15-20 maggio 1939. [Milano, 1939], II vol.: Atti e comunicazioni, p. [372].
- ROHRBACH, Fritz. Der Kartoffelkäfer (*Leptinotarsa decemlineata*) in Deutschland. *Natur und Volk*, Frankfurt a. M. 1940, 70. Bd., Heft 2, S. 90-94, Bilder 1-8.
- ROLAND, G. Contribution à l'étude des maladies des taches noires de la betterave. *Publications de l'Institut belge pour l'amélioration de la betterave, Tirlemont-Belgique*, Renaix, 1939, 7^{me} année, n° 3, p. [171]-178, fig. 1-2. [With titles and summaries also in Flemish, German and English:— 'Bijdrage tot de studie der zwarte vlekken bij beet'. — 'Untersuchungen über Schwarzflecken-Krankheiten bei Rüben'. — 'Contribution to the study of leaf scorch disease of sugar beet'. — Black spot diseases are of two types: secondary type, the most frequent, caused by *Alternaria* sp. and the primary type, the most frequent, caused by *Phoma betae*].
- ROOTS, Walter. La culture des pommes de terre et les maladies de dégénérescence en Esthonie. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 39-45.
- RUSSELL, R. C. Pathogenicity tests with cultures of *Ophiobolus graminis* Sacc. *Scientific Agriculture*, Ottawa, 1939, Vol. XIX, No. 11, pp. 662-669, figs. 1-2. References, p. 669.
- SACHTLEBEN, Hans, unter Mitarbeit von FULMEK, L. Die San José-Schildlaus, *Aspidiotus perniciosus* Comst. *Biologische Reichsanstalt für Land- und Forstwirtschaft. Flugblatt Nr. 122/123*. 2. Auflage. Berlin 1940, 8 S., 1 Taf., 7 Abb.
- SĂVULESCU, Tr. Les maladies de dégénérescence des plantes cultivées, en particulier des pommes de terre. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 60-62. [In Rumania].

- SCHAPER, P. Arbeiten und Probleme zur züchterischen Bekämpfung des Kartoffelkäfers. *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 2, S. [239]-322, 23 Abb., Schrifttum, S. 290; Heft 3, S. [454]-475, 4 Abb. [This important work on the Colorado beetle (*Leptinotarsa decemlineata*) comprises the following chapters:—
I. Ergebnisse der Prüfung deutscher Kultursorten auf das Verhalten gegen den Kartoffelkäfer im freien Befall.
II. Untersuchungen über das Verhalten verschiedener Solanum-Arten gegen den Kartoffelkäfer.
III. Resistenz und Anfälligkeit verschiedener Hybriden der Gattung Solanum gegen den Befall und Frass des Kartoffelkäfers.
IV. Untersuchungen über das Verhalten von Tomaten gegen den Befall und Frass des Kartoffelkäfers].
- SEMPIO, C. Aspetti del problema della resistenza in Patologia vegetale. *IV Congresso internazionale di Patologia comparata. Roma, 15-20 maggio 1939*. [Milano, 1939], II vol.: Atti e comunicazioni, pp. [355]-366, figg. 1-20.
- SECHETILNIKOVA, V. A. On the role of temperature and humidity in the biology of *Trichogramma evanescens* Westw. *Plant Protection*, Leningrad, 1939, No. 19, pp. 56-[66], fig. 1. [Literature], p. [65]. [In Russian, with title and summary also in English].
- SHEPARD, Harold H. Insects infesting stored foods. *University of Minnesota. Agricultural Experiment Station. Bulletin 341*, s. 1., 1939, 43 pp., 20 figs. Literature, pp. 39-42.
- SIBILIA, Cesare. Méthodes modernes de lutte contre les ennemis de la vigne: moyens, appareils, machines et organisation. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939*. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 49-55. [In Italy].
- SILORET, G. Observations sur les manifestations extérieures du coryneum du pêcher. *Annales des Epiphyties et de Phytogénétique*, Paris, 1939, nouv. sér., tome V, fasc. 4, p. [577]-584, fig. 1-5, pl. I-II.
- SILVA, Pedrito. Mais um Membracideo nocivo ao cacauzeiro. *A Bahia Rural*, Bahia-Brasil, 1939, ano VI, n. 62, pag. 7, figs. 1-4. Literatura citada. [*Hoplophora porosa*].
- SILVA, Pedrito. Relação dos insectos observados pela Estação Geral de Experimentação do Instituto de Cacau da Bahia, durante o ano de 1938. *A Bahia Rural*, Bahia-Brasil, 1939, ano VI, ns. 65 e 66, pages. 93 e 95.
- SILVA, Pedrito. Instruções sobre a desinfecção da semente do algodão. *A Bahia Rural*, Bahia-Brasil, 1939, ano VII, n. 70, pag. 219-220, 9 figs.
- SIMON, Jaroslav. La culture estivale de la pomme de terre comme moyen contre la regression de la culture. *XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939*. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 28-35. [In southern Moravia].
- SKOBLO, I. S. The effect of the environmental conditions of the Pyralid moth *Loxostege sticticalis* on the viability of the deposited eggs. *Plant Protection*, Leningrad, 1939, No. 15, pp. 153-157. [Literature], p. 157. [In Russian, with title also in English].
- SMITH, J. Harold. Red scale on citrus trees. *Queensland Agricultural Journal*, Brisbane, 1939, Vol. LII, Pt. 5, pp. 523-528, pl. 232. [*Aonidiella aurantii*].
- SMITH, W. P. Cass. Brown spot, a serious disease of the passion vine. *Journal of the Department of Agriculture of Western Australia*, Perth, 1939, Vol. 16 (Second Series), No. 4, pp. 445-450, pls. I-IV. References, p. 450. [*Alternaria passiflorae* on *Passiflora edulis*].

- SOYER, D. La « rosette » de l'arachide. Recherches sur les vecteurs possibles de la maladie. *Publications de l'Institut National pour l'Etude Agronomique du Congo Belge* (I. N. E. A. C.). Série scientifique N° 21. Bruxelles, 1939, 23 p., 7 fig. Bibliographie, p. 23.
[A virus disease].
- [STATION FÉDÉRALE D'ESSAIS ET DE CONTRÔLE DES SEMENCES, LAUSANNE (MONT-CALME)]. La lutte contre le doryphore en 1940. *La Terre Vaudoise*, Lausanne, 1940, XXXII^{me} année, n° 25, p. 309.
[This communication published on June 22, 1940, states, *inter alia*, that already since several days, foci of *Leptinotarsa decemlineata* have been discovered, some even with larvae. As the heavy rains last autumn prevented second treatment almost entirely, a severe infestation of this parasite is to be expected].
- STEINER, P. Hausbockuntersuchungen (4. Mitteilung). Ist verblautes Holz vor Hausbockbefall geschützt? *Anzeiger für Schädlingskunde*, Berlin 1939, XV. Jahrg., Heft 11, S. 125-128. Literature, S. 128.
[*Hylotrupes bajulus*].
- STRAIB, W. Die Faktorenbeziehungen im Verhalten des Weizens gegen verschiedene Gelbrostrassen. *Zeitschrift für induktive Abstammungs- und Vererbungslehre*, Berlin 1939, Bd. LXXVII, Heft 1, S. [18]-63, Fig. 1-3. Schriftenverzeichnis, S. 63.
[*Puccinia glumarum*].
- SZIRMAI, János. Les maladies de dégénérescence des plantes cultivées et spécialement des pommes de terre. XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 51-55.
[In Hungary].
- THUNG, T. H. On the possibility of immunising tobacco and potato plants against virus diseases. IV Congresso internazionale di Patologia comparata. Roma, 15-20 maggio 1939. [Milano, 1939], II vol.: Atti e comunicazioni, pp. [375]-378.
- TROUVELOT, B. Principes suivis pour la recherche de plantes résistantes aux attaques du doryphore. Comité des Travaux Historiques et Scientifiques. Comptes rendus du Congrès des Sociétés Savantes de Paris et des Départements tenu à Bordeaux en 1939. Section des Sciences. Paris, 1939, p. [117]-119.
[*Leptinotarsa decemlineata*].
- TURNER, Neely. Control of European corn borer by sprays and dusts. Connecticut Agricultural Experiment Station. Circular 130, New Haven, 1939, 4 pp., 1 fig.
[*Pyrausta nubilalis*].
- TURNER, Neely. Control of European corn borers on dahlias. Connecticut Agricultural Experiment Station. Circular 133, New Haven, 1939, 3 pp., 1 fig.
[*Pyrausta nubilalis*].
- TURNER, Neely, and TOWNSEND, James F. Control of termites in buildings. Connecticut Agricultural Experiment Station. Circular 134, New Haven, 1939, 14 pp., 9 figs.
[*Reticulitermes flavipes*].
- URQUIJO LANDALUCE, Pedro. Los mojantes en los tratamientos insecticidas y anti-criptogámicos. *Agricultura*, Madrid, 1940, año IX, n° 96, págs. 149 y 150, 4 figs.
- VAN DER LAAN, P. A. Wat bekend is over de tabakskever *Lasioderma*. *Deli Proefstation te Medan*. *Vlugschrift* No. 65, Medan 1939, 4 blz., 3 fig.
[*Lasioderma serricornis*].
- VANDERWALLE, R. Observations sur l'action de la colchicine et autres substances mito-inhibitrices sur quelques champignons phytopathogènes. *Bulletin de la Société Royale de Botanique de Belgique*, Gambloux, 1939, tome LXXII, 2^{ème} sér., tome XXII, fasc. 1, p. [63]-67, fig. 1-2.
[*Botrytis cinerea*, *Graphium ulmi*].
- VAN PORTEREN, N. Etat de la lutte contre le doryphore en Hollande. XVIII^e Congrès international d'Agriculture. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 9.
[*Leptinotarsa decemlineata*].

- VAN SCHREVEN, D. A. Infectieproeven met het virus van vergelingsziekte suikerbieten in de jaren '36, '37 en '38 en eenige waarnemingen in deze jaren, met betrekking tot het voorkomen van de bladluis *Aphis fabae* Scop. *Mededeelingen van het Instituut voor Suikerbietenleer*, Bergen op Zoom, Nederland 1939, blz. 337-358. Literatuur, blz. 356.
[In Dutch, with title and summary also in French:— 'Essais d'inoculation avec le virus de betteraves sucrières atteintes de la jaunisse pendant les années 1936, '37 et '38 et quelques observations au cours de ces années relativement à la présence du puceron *Aphis fabae* Scop.'].
VASILJESKI, A., and ZUBOV, M. Soviet solbar against Erysiphe cichoracearum on cucumbers under greenhouse conditions. *Plant Protection*, Leningrad, 1939, No. 19, pp. 170-173.
[In Russian, with title also in English].
VELOSO Ch., Gustavo. Las conchuelas y las fumaginas. *El Agricultor del Norte*, La Serena (Chile), 1939, año 25, n° 12, pág. 315.
[Saissetia, Lepidosaphes and sooty mould of citrus].
VICKERY, Joyce W. Milky lobelia (*Lobelia concolor*). A native weed becoming troublesome. *The Agricultural Gazette of New South Wales*, Sydney, 1939, Vol. L, Pt. 11, pp. 591-593, 1 fig.
VITTORIA, Antonio. Sulla causa della «fétola» e sui mezzi di lotta relativi. *L'Italia Agricola*, Roma, 1940, anno 77, n. 5, pp. [355]-357.
[This disorder of certain citrus fruits is caused by puncturing of *Empoasca* sp.].
VIVAS, Oscar. El piretro. El cultivo auxiliar de la chacra y quinta cordobesa. *Boletín de Agricultura y Ganadería*, Córdoba, 1939, n° 174, págs. 28 a 31, 1 fig.
[*Chrysanthemum cinerariaefolium*].
VOLKART, A. Der Roggensteinbrand (*Tilletia Secalis* [Corda] Kcke.). *Berichte der Schweizerischen Botanischen Gesellschaft*, Bern 1939, Bd. 49, S. [495]-503. Literatur, S. 502-503.
VOLKART, A. Les maladies de dégénérescence chez les plantes cultivées, et spécialement chez la pomme de terre. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 63-65.
[In Switzerland].
VOLJERT, H. E. Allemagne: L'état de la lutte contre le doryphore. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section IV: Production végétale. Rapports spéciaux, p. 5-8.
[*Leptinotarsa decemlineata*].
VOSKRESENSKALA, A. K. On the principles of the resistance of some insects to arsenic insecticides. *Plant Protection*, Leningrad, 1939, No. 19, pp. 132-144, figs. 1-2. [Literature], p. [144].
[In Russian, with title and summary also in English].
VOSS, J. Zur Prüfung der Resistenz von Hafersorten gegen Flugbrand (*Ustilago avenae* [Persoon] Jensen). *Zeitschrift für Pflanzenzüchtung*, Berlin 1939, Bd. XXIII, Heft 1, S. [20]-46, Abb. 1-5. Schrifttum, S. 46.
VOUKASSOVITCH, Pavlé. Méthodes modernes de lutte contre les ennemis de la vigne: moyens, appareils, machines et organisation. *XVIII^e Congrès international d'Agriculture*. Dresden, 6-12 juin 1939. Berlin, Reichsnährstand Verlags-Ges. M. B. H., 1939, Section V: Viticulture, arboriculture fruitière et cultures spéciales. Rapports spéciaux, p. 55-58.
[In Yugoslavia].
WILLISON, R. S. Fall spray injury to peach trees. *Scientific Agriculture*, Ottawa, 1939, Vol. XIX, No. 11, pp. 670-672, pls. I-II. References, p. 672.

Prof. UGO PAPI, Segretario generale dell'Istituto, Direttore responsabile.

INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

PALESTINE.

Diseases of Ornamental Plants. †

The following is a preliminary list of diseases occurring on ornamental plants in Palestine, as studied at the Division of Plant Pathology of the Agricultural Research Station, Rehovot, from 1923 to 1938. The author was assisted in the collection and determination of these diseases by Dr M. Chorin, Ing. G. Minz, Dr J. Perlberger and Dr F. Littauer, assistants at the above mentioned laboratory.

| | | |
|-------------------------------|--|----------------------|
| ACACIA BAILEYANA F. MUELL. | <i>Fusarium</i> sp. | Damping off. |
| 1. CYANOPHYLLA LINDL. | <i>Diplodia</i> sp. | Leaf spot. |
| | <i>Pestalozzia</i> sp. | Leaf spot. |
| A. DECURRENS WILLD. | <i>Fusarium</i> sp. | Damping off. |
| A. LONGIFOLIA WILLD. | <i>Alternaria</i> sp. | Leaf spot. |
| A. LOPHANTHA WILLD. | Chlorosis (non-parasitic). Leaf drop (non-parasitic). | |
| A. SUAVEOLENS WILLD. | Black tip (non-parasitic). | Leaves. |
| ACACIA sp. | <i>Fusarium</i> sp. | Root rot. |
| ACALYPHA INDICA LINN. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| A. WILKESIANA MUELL. ARG. | <i>Fusarium</i> sp. | Collar and root rot. |
| | <i>Pestalozzia</i> sp. | Leaf spot. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |

* Under this and the next heading the countries are arranged in French alphabetical order.

† Communication from the official correspondent of the Institute, Dr I. REICHERT, Chief Plant Pathologist, Division of Plant Pathology, Agricultural Research Station, Rehovot, Palestine.

| | | |
|------------------------------------|--|---|
| <i>ACER NEGUNDO</i> LINN. | <i>Rhizoctonia solani</i> Kühn. | Collar rot. |
| <i>ACONITUM NAPELLUS</i> LINN. | <i>Fusarium</i> sp. | Root rot. |
| <i>AILANTHUS</i> sp. | <i>Rhizoctonia solani</i> Kühn. | Root rot; damping off. |
| <i>ALOE ARBORESCENS</i> MILL. | Hail spot. | |
| <i>ALOE</i> sp. | <i>Bacterium</i> sp. Hail spot. | Leaf rot. |
| <i>AMARANTHUS</i> sp. | <i>Fusarium</i> sp. <i>Pythium</i> sp. <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. | Root rot. Collar rot. Root rot. Root rot. |
| <i>AMARYLLIS</i> sp. | Leaf spot (undetermined). | |
| <i>AMPELOPSIS VEITCHII</i> VOSS. | Gum spot (undetermined). Dry leaf spot (undetermined). | Leaves. |
| <i>ANTIGONON</i> sp. | <i>Pythium</i> sp. | Root rot. |
| <i>ANTIRRHINUM MAJUS</i> LINN. | <i>Alternaria</i> sp. <i>Fusarium</i> sp. <i>Phoma</i> sp. <i>Puccinia antirrhini</i> Diet. et Holw. <i>Pythium</i> sp. <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. <i>Sclerotium rolfsii</i> Sacc. <i>Septoria antirrhini</i> Desm. Hail spot. <i>Heterodera marioni</i> (Cor- nu) Goodey. | Leaf spot. Root rot; wilt. Leaf spot. Rust. Damping off. Root rot, collar and root rot. Collar and root rot. Collar and root rot. Stem and leaves. Root knot. |
| <i>ARALIA JAPONICA</i> THUNB. | <i>Fusarium</i> sp. <i>Sclerotium bataticola</i> Taub. | Root rot. Root rot. |
| <i>ARAUCARIA</i> sp. | <i>Alternaria</i> sp. <i>Bacterium</i> sp. <i>Pythium</i> ? Yellows (non-parasitic). Scorch (undetermined). | Twig and needle blight. Twig and needle blight. Twig blight. Twigs and needles. Twigs. |
| <i>ASCLEPIAS CURASSAVICA</i> LINN. | <i>Fusarium</i> sp. <i>Rhizoctonia solani</i> Kühn. | Damping off. Damping off. |

| | | |
|----------------------------|---|--------------------------------|
| ASTER sp. | <i>Alternaria</i> sp. | Leaf spot. |
| | <i>Fusarium</i> sp. | Root rot; wilt; collar rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot; root rot. |
| AUCUBA sp. | <i>Gloeosporium</i> sp. | Anthracnose on stem. |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| AZALEA sp. | <i>Bacterium</i> sp. | |
| BAUHINIA PURPUREA LINN. | <i>Rhizoctonia solani</i> Kühn. | Damping off. |
| BEGONIA sp. | <i>Alternaria</i> sp. | Leaf spot. |
| | <i>Bacterium</i> sp. | Leaf spot, leaf rot. |
| | <i>Fusarium</i> sp. | Bulb rot, leaf rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| | Leaf spot (undetermined). | |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| | | |
| BELLIS PERENNIS LINN. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| BIGNONIA sp. | Wither-tip (undetermined) | |
| BORRAGO OFFICINALIS LINN. | <i>Alternaria</i> sp. | Leaf spot. |
| BOUGAINVILLEA sp. | <i>Fusarium</i> sp. | Root rot. |
| | Blight (non-parasitic). | |
| | Leaf scorch (undetermined). | |
| BRACHYCHITON sp. | Gum spot (undetermined). | |
| | Leaf spot (undetermined). | |
| | Wither-tip (undetermined). | |
| BUDDLEIA sp. | Mosaic spots (undetermined). | Leaf spot. |
| CAESALPINA GILLIESII WALL. | <i>Fusarium</i> sp. | Root rot. |
| | | |
| CAJANUS INDICUS SPRENG. | <i>Fusarium</i> sp. | Collar and root rot. |
| CALENDULA sp. | <i>Oidium</i> sp. | Mildew. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| CALOTROPIS PROCERA DRYAND | <i>Cercospora</i> sp. | Leaf spot. |

| | | |
|---|--|---|
| <i>CAMELLIA</i> sp. | Leaf spot (non-parasitic). | |
| <i>CANAVALIA ENSIFORMIS</i> DC. | <i>Cercospora</i> sp. | Leaf spot. |
| <i>CARYOTA</i> sp. | <i>Pestalozzia</i> sp. | Leaf spot. |
| <i>CASSIA FLORIBUNDA</i> GRISEB. | <i>Ganoderma</i> sp. | Stem, collar and root rot, wood rot. |
| <i>CASTANEA VESCA</i> GAERTN. | Leaf scorch (undetermined). | |
| <i>CASUARINA</i> sp. | <i>Fusarium</i> sp. <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. Wither-tip (non-parasitic). | Wilt. |
| <i>CATALPA</i> sp. | <i>Peronospora</i> sp. <i>Sclerotium bataticola</i> Taub. | Downy mildew. |
| <i>CEIBA PENTANDRA</i> GAERTN. | <i>Fusarium</i> sp. <i>Phoma</i> sp. | Root rot. Root rot. |
| <i>CENTAUREA FLORIPLENA</i> . | <i>Sclerotinia sclerotiorum</i> (Lib.) Mass. | Stem dry rot. |
| <i>C. PALLESCENS</i> DELILE. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>CEPHALOCEREUS SENILIS</i> PFEIFF. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>CERCIS SILIQUASTRUM</i> LINN. | <i>Fusarium</i> sp. <i>Pythium</i> sp. <i>Rhizoctonia solani</i> Kühn. | Root rot. Damping off. Damping off. |
| <i>CEREUS GRANDIFLORUS</i> MILL. | <i>Bacterium</i> sp. <i>Fusarium</i> sp. | Black collar rot. Collar rot. |
| <i>C. PITA JAYA</i> DC. var. <i>MONSTRUOSUS</i> . | <i>Fusarium</i> sp. | Collar rot. |
| <i>C. TUBEROSUS</i> PFEIFF. | <i>Bacterium</i> sp. | Collar soft rot. |
| <i>CHAMAEROPS EXCELSA</i> THUNB. | <i>Cladosporium</i> sp. | Leaf spot. |
| <i>CHAMAEROPS</i> sp. | <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. Leaf scorch (non-parasitic). <i>Heterodera marioni</i> (Cornu) Goodey. | Root rot. Root rot. Root knot. |
| <i>CHRYSANTHEMUM CINERARIAEFOLIUM</i> VIS. | <i>Fusarium</i> sp. <i>Rhizoctonia solani</i> Kühn. | Root rot; damping off. Root rot. |

| | | |
|--|--|----------------------|
| <i>CHRYSANTHEMUM INDICUM</i> LINN. | <i>Alternaria</i> sp. | Stem blight. |
| | <i>Fusarium</i> sp. | Stem blight. |
| <i>CHRYSANTHEMUM</i> sp. | <i>Cylindrosporium chrysanthemi</i> Ell. et Dearn. | Leaf spot. |
| | <i>Fusarium</i> sp. | Collar and root rot. |
| | <i>Puccinia chrysanthemi</i> Roz. | Rust. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar rot. |
| | Tip burn. | Seedling leaves. |
| <i>CICER ARIETINUM</i> LINN. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Uromyces ciceris-arietini</i> (Grog.) Jacz. et Boy. | Rust. |
| <i>CNICUS BENEDICTUS</i> LINN. | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| <i>COCOS PLUMOSA</i> HOOK. | <i>Alternaria</i> sp. | Leaf spot. |
| <i>C. WEDDELLIANA</i> WENDL. | <i>Alternaria</i> sp. | Leaf spot. |
| <i>COFFEA ARABICA</i> LINN. | <i>Alternaria</i> sp. | Leaf spot. |
| | <i>Glocosporium coffeanum</i> Delacroix. | Leaf spot. |
| <i>COLEUS</i> sp. | <i>Phoma</i> sp. | Black stem spot. |
| | <i>Rhizoctonia solani</i> Kühn. | Stem and root rot. |
| <i>COLUTEA ARBORESCENS</i> LINN. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| <i>CORONILLA GLAUCA</i> LINN. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Pythium</i> sp. | Root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| <i>CORYPHA AUSTRALIS</i> R. BR. | <i>Phyllosticta</i> sp. | Leaf spot. |
| | White leaf spot, wither-tip (non-parasitic). | |
| | <i>Heterodera marioni</i> (Connu) Goodey. | Root knot. |
| <i>COTONEASTER FRANCHETI</i> BOIS. | <i>Sclerotium bataticola</i> Taub. | Collar rot. |
| <i>CRASSULA PSEUDOLYCOPODIODES</i> DINTER ET SCHINZ. | <i>Heterodera marioni</i> (Connu) Goodey. | Root knot. |
| <i>CUPRESSUS ARIZONICA</i> GREENE. | <i>Fusarium</i> sp. | Damping off. |

| | | |
|--|--|---|
| <i>CUPRESSUS MACROCARPA</i> HARTW. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Verticillium</i> sp. | Wilt. |
| <i>C. SEMPERVIRENS</i> LINN. | <i>Alternaria</i> sp. | Damping off (associated with <i>Fusarium</i>). |
| | <i>Fusarium</i> sp. | Damping off and root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| | <i>Trichoderma</i> sp. | Damping off. |
| | Damping off (undetermined). | |
| | Drying of branches at their tips (undetermined). | |
| | Yellowing of branches (undetermined). | |
| <i>CYCAS REVOLUTA</i> THUNB. | <i>Phyllosticta</i> sp. | Leaf spot. |
| | <i>Pleospora</i> sp. | Leaf spot. |
| | Leaf spot (undetermined). | |
| <i>CYCLAMEN NEAPOLITANUM</i> TENORE. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root-knot. |
| <i>DACTYLOCTENIUM AEGYPTIACUM</i> WILLD. | <i>Fusarium</i> sp. | Wilt. |
| | <i>Rhizoctonia solani</i> Kühn. | Root and stem rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| | | |
| <i>DAHLIA VARIABILIS</i> DESF. | <i>Alternaria</i> sp. | Black leaf spot. |
| | <i>Bacterium</i> sp. | Tuber rot. |
| | <i>Fusarium</i> sp. | Wilt, tuber rot. |
| | <i>Macrosporium</i> sp. | Leaf spot. |
| | <i>Oidium</i> sp. | Mildew. |
| | <i>Rhizoctonia solani</i> Kühn. | Stem rot, wither-tip, dry rot of stems. |
| | <i>Sclerotinia</i> sp. | |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| | <i>Stemphylium</i> sp. | Black leaf spot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| | | |
| | | |
| <i>DATURA</i> sp. | <i>Alternaria crassa</i> (Sacc.) Rand. | Leaf spot. |
| <i>DELPHINIUM</i> sp. | <i>Fusarium</i> sp. | Root and collar rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | Yellow leaf discoloration (non-parasitic). | |

| | | |
|---|---|-------------------------------|
| <i>DERRIS ELLIPTICA</i> BENTH. | <i>Fusarium</i> sp. | Root rot. |
| <i>DEUTZIA GRACILIS</i> SIEB. ET ZUCC. | Leaf spot (undetermined). | |
| <i>DIANTHUS BARBATUS</i> LINN. | <i>Oidium</i> sp. | Mildew. |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| | <i>Uromyces</i> sp. | Rust. |
| <i>D. CARYOPHYLLUS</i> LINN. | <i>Alternaria dianthi</i> Stev. et Hall. | Leaf spot. |
| | Basidiomycetes. | Root rot. |
| | <i>Fusarium</i> sp. | Root rot, wilt. |
| | <i>Heterosporium echinula-</i> <i>tum</i> (Berk.) Cke. | Leaf spot 'fairy ring'. |
| | <i>Oidium</i> sp. | Powdery mildew. |
| | <i>Phoma</i> sp. | |
| | <i>Phytophthora</i> sp. | Root rot. |
| | <i>Pleospora</i> sp. | Black stem spot. |
| | <i>Puccinia dianthi</i> DC. | Rust. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot, damping off. |
| | <i>Sclerotinia minor</i> Jagger. | Stem dry rot, root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Root and stem rot; drying. |
| | <i>Sclerotium rolfsii</i> Sacc. | Root rot. |
| | <i>Septoria dianthi</i> Desm. | Leaf spot |
| | <i>Uromyces caryophyllinus</i> (Schrank.) Wint. | Rust. |
| | Leaf and stem drying (un- determined). | |
| | Violet leaf spot (unde- termined). | |
| | Wither-tip (non-parasitic). | |
| | Yellowing of leaves (un- determined). | |
| | Yellow leaf spot (undeter- mined). | |
| | <i>Heterodera marioni</i> (Cor- nu) Goodey. | Root knot. |
| <i>DIMORPHOTHECA</i> sp. | <i>Fusarium</i> sp. | Wilt. |
| <i>DIPLOTAXIS</i> sp. | <i>Heterodera marioni</i> (Cor- nu) Goodey. | Root knot. |
| <i>DODONEA VISCOSA</i> LINN. | Brown leaf spot (unde- termined). | |
| | <i>Cuscuta monogyna</i> Vahl. | |

| | | |
|---------------------------------------|--|-----------------------|
| <i>DORYALIS HEBECARPA</i> WARB. | Frost injury. | |
| <i>DRACAENA DRACO</i> LINN. | <i>Alternaria</i> sp. | Leaf spot. |
| | <i>Diplodiella</i> sp. | Leaf spot. |
| | <i>Phyllosticta</i> sp. | Leaf spot. |
| | Leaf spot (undetermined). | |
| <i>DURANIA FLUMIERI</i> JACQ. | <i>Pleospora</i> sp. | Blight. |
| <i>ECHINVERIA</i> sp. | White leaf spot (non-parasitic). | |
| <i>ECHINOWERUS PROUMBENS</i> LEM. | <i>Bacterium</i> sp. | Soft rot. |
| <i>ECHINOOPSIS</i> sp. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>ERYTHRINA CORALLODENDRON</i> LINN. | <i>Oidium</i> sp. | Mildew. |
| <i>E. CRISTA-GALLI</i> LINN. | <i>Gloeosporium</i> sp. | Anthracnose. |
| <i>EUCALYPTUS</i> sp. | <i>Alternaria</i> sp. | Black leaf spot. |
| | <i>Bacterium tumefaciens</i> EFS. et Town. | Crown gall. |
| | <i>Diplodia</i> sp. | |
| | <i>Fusarium</i> sp. | Rootlet rot. |
| | <i>Phoma</i> sp. | Leaf spot. |
| | <i>Rhizoctonia solani</i> Kühn. | Damping off. |
| | Dry leaf spot (undetermined). | |
| | Leaf spot (undetermined). | |
| | Red leaf spot (undetermined). | |
| | Yellow leaf discoloration (non-parasitic). | |
| | Yellow leaf discoloration (undetermined). | |
| <i>EUPHORBIA BOHALINA</i> BOISS. | <i>Fusarium</i> sp. | Root rot, wilt. |
| <i>E. GLOBOSA</i> SIMS. | <i>Fusarium</i> sp. | Collar rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>E. SPLENDENS</i> BOJER | <i>Fusarium</i> sp. | Collar rot. |
| <i>EUPHORBIA</i> sp. | <i>Bacterium</i> sp. | Collar and root rot. |
| | <i>Fusarium</i> sp. | Die-back; collar rot. |

| | | |
|----------------------------------|---|---|
| <i>EUONYMUS JAPONICUS</i> LINN. | <i>Alternaria</i> sp. White leaf spot (non-parasitic). Leaf spot (undetermined). | Leaf spot. |
| <i>FICUS ELASTICA</i> ROXB. | <i>Fusarium</i> sp. <i>Gloeosporium</i> sp. <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. Leaf spot (non-parasitic). Leaf spot (undetermined). Wither-tip (non-parasitic). | Root rot; collar rot. Leaf spot. Collar rot. Collar rot. |
| <i>F. MACROPHYLLA</i> DESF. | Leaf scorch (undetermined). Leaf spot (undetermined). | |
| <i>F. NIJIDA</i> THUNB. | <i>Diplodia</i> sp. <i>Fusarium</i> sp. <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. Blight (non-parasitic). | Collar and root rot. Root rot. Collar and root rot. Collar and root rot. |
| <i>FICUS</i> sp. | <i>Alternaria</i> sp. <i>Phyllosticta</i> sp. Leaf discoloration (non-parasitic). Leaf scorch (non-parasitic). Leaf spot (undetermined). | Leaf spot. Leaf spot. |
| <i>FOURCROYA GIGANTEA</i> VENT. | Hail spot. | |
| <i>FRAXINUS OXYCARPA</i> WILLD. | <i>Fusarium</i> sp. | Damping off. |
| <i>FUCHSIA</i> sp. | <i>Rhizoctonia solani</i> Kühn. Leaf scorch (non-parasitic). | Collar and root rot. |
| <i>GAILLARDIA</i> sp. | <i>Fusarium</i> sp. <i>Rhizoctonia solani</i> Kühn. | Collar rot. Collar rot. |
| <i>GARDENIA</i> sp. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>GENISTA SPHACELATA</i> DECNE. | <i>Fusarium</i> sp. | Wilt. |

| | | |
|--|--|----------------------|
| <i>GERANIUM</i> sp. | <i>Alternaria</i> sp. | Black leaf spot. |
| | <i>Diplodia</i> sp. | Black stem rot. |
| | <i>Fusarium</i> sp. | Wilt. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| | Wither-tip (non-parasitic). | On leaves. |
| <i>GLADIOLUS</i> sp. | <i>Alternaria</i> sp. | Leaf spot. |
| | <i>Bacterium</i> sp. | Soft rot of corms. |
| | <i>Cladosporium</i> sp. | Leaf spot. |
| | <i>Fusarium</i> sp. | Root rot. |
| <i>GOMPHRENA</i> sp. | <i>Alternaria</i> sp. | Leaf spot. |
| | Dry yellow leaf spot (non-parasitic). | |
| <i>GRATIOLA OFFICINALIS</i> LINN. | ? | Damping off. |
| <i>GREVILLEA ROBUSTA</i> CUNN. | <i>Bacterium</i> sp. | Damping off. |
| | <i>Fusarium</i> sp. | Wilt; damping off. |
| | <i>Rhizoctonia</i> sp. | Collar rot. |
| | ? | Rust on leaves. |
| | Wither-tip (non-parasitic). | |
| | Yellowing and drying of leaves. (non-parasitic). | |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>GYPSOPHILA</i> sp. | <i>Macrosporium</i> sp. | Leaf spot. |
| | <i>Cuscuta</i> sp. | |
| <i>HELIANTHUS CUCUMERIFOLIUS</i> TOW. ET GRAY. | <i>Sclerotium bataticola</i> Taub. | Rootlet rot. |
| <i>HELIOTROPIMUM EUROPAEUM</i> LINN. | <i>Cercospora</i> sp. | Leaf spot. |
| | | |
| <i>H. PERUVIANUM</i> LINN. | Wilting and drying of leaves (undetermined). | |
| | Leaf scorch (undetermined). | |
| <i>HIBISCUS MUTABILIS</i> LINN. | Leaf scorch (undetermined). | |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>H. ROSA-SINENSIS</i> LINN. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Macrosporium</i> sp. | Leaf spot. |
| | <i>Phyllosticta</i> sp. | Leaf spot. |
| | <i>Pleospora</i> sp. | Leaf spot. |

| | | |
|----------------------------------|---|---|
| <i>HIBISCUS</i> sp. | <i>Fusarium</i> sp. | Stem bark rot; rot of cuttings. |
| <i>HOYA CARNOSA</i> R. BR. | <i>Gloeosporium</i> sp. Leaf and fruit drying (non-parasitic). | Anthracnose on leaves. |
| <i>HYOSCYAMUS</i> sp. | Collar and root rot (undetermined). | |
| <i>IMPATIENS BALSAMINA</i> LIN. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>IPOMOEA DIGITATA</i> LINN. | <i>Oidium</i> sp. Drying of the leaves (non-parasitic). | Mildew. (Winds). |
| <i>IPOMOEA</i> sp. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>IRIS LISMARCKIANA</i> DAMMAN. | <i>Septoria</i> sp. | Leaf spot. |
| <i>I. PALLIDA</i> LAM. | <i>Puccinia iridis</i> (DC.) Rabh. | Rust. |
| <i>IRIS</i> sp. | <i>Alternaria</i> sp. <i>Fusarium</i> sp. <i>Heterodera marioni</i> (Cornu) Goodey. | Leaf spot. Wilt. Root knot. |
| <i>JARACANDA</i> sp. | <i>Alternaria</i> sp. <i>Fusarium</i> sp. <i>Phoma</i> sp. <i>Rhizoctonia solani</i> Kühn. <i>Sclerotium bataticola</i> Taub. Blight of branches (non-parasitic). Drying of seedlings (non-parasitic). Withering of leaves, leaf scorch (non-parasitic). | Damping off. Damping off. Damping off. Root rot. Damping off; root rot. |
| <i>JASMINUM</i> sp. | <i>Phyllosticta</i> sp. Drying of cuttings (non-parasitic). <i>Heterodera marioni</i> (Cornu) Goodey. | Leaf spot. Root knot. |

| | | |
|--------------------------------|---|---------------------------------------|
| <i>KOCHIA</i> sp. | <i>Fusarium</i> sp. | Collar and root rot (damping off). |
| | <i>Rhizoctonia solani</i> Kühn. | Damping off. |
| <i>LATANIA BORBONICA</i> LAM. | <i>Colletotrichum</i> sp. | Leaf spot. |
| | <i>Heterodera marioni</i> (Connu) Goodey. | Root knot. |
| <i>LATHYRUS ODORATUS</i> LINN. | <i>Uromyces</i> sp. | Rust. |
| <i>L. SATIVUS</i> LINN. | <i>Oidium</i> sp. | Mildew. |
| <i>LAURUS INDICA</i> LINN. | Gum spot (non-parasitic). | |

(to be continued).

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany. — An Ordinance of April 2, 1940 by the deputy of the Minister of Agriculture dealing with questions referring to seeds, revises the regulations relative to the trade in potatoes [see this *Bulletin*, 1939, No. 5, pp. 110-111], to conform them to the provisions taken by the Railway Department on November 30, 1939, regarding the time allowed in unloading the trucks. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Mai 1940, Bd. XII, Nr. 3, S. 54).

* * An Ordinance of April 3, 1940 by the deputy of the Minister of Agriculture dealing with questions referring to seeds, revises the regulations of September 16, 1937 relative to potato varieties resistant to wart disease [*Synchytrium endobioticum*: see this *Bulletin*, 1938, No. 2, p. 28].

Farms where in 1939 the potato varieties 'Allerfrüheste Gelbe' and 'Centifolia' were recognized as certified plants, may also obtain authorization for these varieties in 1940, but only for an area not exceeding that cultivated in 1939. (*Ibid.*).

* * The new list of the communes infested with grape phylloxera [*Dactylosphaera vitifoliae*] and those suspected or in danger of being infested has been published in the *Deutscher Reichsanzeiger und Preussischer Staatsanzeiger*, No. 78 of April 3, 1940. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, Anfang Mai 1940, 20. Jahrg., Nr. 5, S. 27).

* * A communication (No. 82 of April 10, 1940) of the Corporation of Agriculture gives notification of certain restrictions applied to trade in insecticides and fungicides. In the case of some chemical products, only a certain percentage of the quantity sold in 1939 can be supplied to customers: 30 per cent. for copper sulphate and borax; 70 per cent. for preparations made with copper, and for those containing copper in combination or in mixture with lime, arsenic, lead and pyrethrum; 75 per cent. for sulphur used for treating vines.

These products may only be sold to customers who had bought them in 1939. No customer may obtain more than the quantity allotted him on the basis of the amount purchased in 1939 and according to the percentage established. (*Ibid.*).

*** The eighth Decree of May 21, 1940, relative to the Colorado beetle [*Leptinotarsa decemlineata*] slightly modifies the seventh Decree [see this *Bulletin*, 1939, No. 7, pp. 157-159].

An appendix to this Decree lays down the revised delimitation of the control zone ('Überwachungsgebiet'), necessary in view of the advance in invasion. (*Reichsgesetzblatt*, Teil I, Berlin, 22. Mai 1940, Nr. 90, S. 793-794).

England and Wales. — By the Rabbits Order, 1939, dated October 12, 1939, where the War Agricultural Executive Committee is satisfied that injury to crops or trees or wastage of pasturage is being caused or is likely to be caused by rabbits, the Committee may by order authorize the killing and taking of the rabbits. (*Statutory Rules and Orders 1939, No. 1493*, London, 1939, 2 pp.).

Scotland. — An Order in Council, dated October 19, 1939, adds Regulations 63-A to the Defence Regulations, 1939. This Regulation contains provision regarding damage by deer, hares and rabbits to crops in Scotland. (*Statutory Rules and Orders 1939 No. 1465*, London, 1939, 2 pp.).
S. 105

*** The Hares and Rabbits (Scotland) Order, 1939, dated November 2, 1939, regards the killing and taking of hares and rabbits for the purpose of preventing damage to crops, trees, pasturage, fences, banks, or works. (*Statutory Rules and Orders 1939, No. 1654*, London, 1939, 2 pp.).
S. 121

*** The Deer (Scotland) Order, 1939, dated November 2, 1939, authorises the killing and taking of deer injurious to crops, trees, pasturage, fences, banks or works in Scotland. (*Statutory Rules and Orders 1939, No. 1655*, London, 1939, 2 pp.).
S. 122

Spain. — 'Orden' of June 10, 1940 specifies the measures to be adopted in locust control. (*Boletín Oficial del Estado*, Madrid, 12 de junio de 1940, año V, núm. 164, págs. 4055 y 4056).

*** By 'Orden' of June 22, 1940, all consignments of living plants and parts of these plants from continental Spain and the Balearic and Canary Islands, intended for export to England and Scotland must have been inspected and be accompanied by a phytosanitary certificate of the country of origin. (*Ibid.*, 27 de junio de 1940, núm. 179, pág. 4405).

United States of America. — By an Act approved on April 26, 1940 the Secretary of Agriculture is authorized in co-operation with such agencies as he may deem necessary to use such funds as have been, or may hereafter be, made available for the purpose of controlling white pine blister rust [*Cronartium ribicola*], by preventing the spread to, and eliminating white pine blister rust from, all forest lands, irrespective of the ownership thereof, when in the judgment of the Secretary of Agriculture the use of such funds on such lands is necessary in the control of the white pine blister rust. ([*Public — No. 486 — 76th Congress*]. [*Chapter 159 — 3d Session*]. [*H. R. 3406*]. *An Act for forest protection against the white pine blister rust, and for other purposes*. [Washington, D. C., 1940], 1 p.).

Italy. — According to Ministerial Decree of January 27, 1940 the proprietors and occupiers of cotton lands in Sicily are obliged to destroy for phytosanitary purposes all stalks and bolls left on the fields, not later than March 31 each year. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, Roma, 21 febbraio 1940, anno XII, n. 6, pp. 206-207).

* * A Decree of the Minister of the Interior, dated July 20, 1938 rendered compulsory the inclusion of agricultural parasiticides in the list of medicinal and surgical remedies subject to registration, by virtue of Article 189 of the Health Laws.

By Circular No. 476 of April 4, 1940, the Minister of Agriculture and Forests communicates that, in the application of the aforesaid Ministerial Decree, an agreement has been reached between the Ministry of Agriculture and Forests and the Ministry of the Interior, by virtue of which the registration of agricultural parasiticides is contingent on the favourable result of a double government testing of these products, that is:—

(1) checking the chemical composition of the preparation with the formula supplied by the manufacturer in presenting his application;

(2) testing the efficacy of the preparation (as regards its effect on the plant pests against which the product is specially recommended by the manufacturers) and its effect on plant growth.

The first of these tests is carried out at the Institute of Public Health (to which applications for registration should be addressed) while the second is entrusted to the Ministry of Agriculture and Forests and is delegated to the different Institutes of the Ministry, and to which the Circular in question indicates the instructions to be followed *.

* * By Ministerial Decree of April 5, 1940, the control of the cockchafer (*Melolontha melolontha*), by collecting the adults, has been made compulsory in the province of Belluno during 1940. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, 21 aprile-10 maggio 1940, nn. 12-13, pp. 589-590).

* Communication from the Ministry of Agriculture and Forests, Rome, Italy.

* * A Ministerial Decree of May 11, 1940 authorizes the hunting and capture of wild rabbits, declared noxious animals, in the Province of Novara. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 20 maggio 1940, anno 81^o, n. 117, p. 1831).

* * Royal Decree No. 757 of May 13, 1940 establishes the regulations for the application of the Royal Decree-Law No. 1622 of September 5, 1938 [see this *Bulletin*, 1939, No. 2, pp. 32-34] converted into Law by Law No. 156 of January 5, 1939 [see this *Bulletin*, 1939, No. 5, p. 112] relative to measures on the sanitary protection of fruit plants. (*Ibid.*, 9 luglio 1940, n. 150, pp. 2508-2514).

* * Law No. 835 of May 30, 1940 ratifies the Italian-German Agreement relative to frontier trade stipulated on February 24, 1940 at Rome.

According to Article 13 of this Agreement, the interdiction and restrictions of import and export, regarding the protection of crops against diseases, pests and other parasites, remain in force, in as far as these measures are applicable to all countries or to countries in identical conditions. (*Ibid.*, 18 luglio 1940, n. 167, pp. 2642-2647).

* * A Ministerial Decree of June 19, 1940 authorizes hunting and capture of wild rabbits, declared pests in the Isle of Gorgona. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, 11 luglio 1940, n. 20, pp. 1064-1065).

* * A Ministerial Decree of June 27, 1940 opens a prize competition for the industrial cultivation in 1941 of pyrethrum [*Chrysanthemum cinerariaefolium*] in the Provinces of Pola, Zara, Reggio di Calabria, Cosenza and Sassari. (*Gazzetta Ufficiale del Regno d'Italia*, 2 agosto 1940, n. 180, pp. 2919-2920).

* * Ministerial Decree of June 30, 1940 abrogates the Ministerial Decree of March 30, 1940 [see this *Bulletin*, 1940, No. 9, p. 167] regarding the compulsory control of the olive fly [*Dacus* (*Daculus*) *oleae*] in the Provinces of Cagliari, Nuoro and Sassari.

For the year 1940, this new Ministerial Decree on compulsory control by means of arsenical sprays only refers to the Province of Sassari. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, 11 luglio 1940, n. 20, pp. 1061-1063).

Kenya (Colony and Protectorate of). -- By Government Notice No. 127 of February 3, 1940, Government Notice No. 687 of September 2, 1937 [see this *Bulletin*, 1938, No. 4, p. 82] has been amended by adding to the First Schedule thereto, under the heading 'Diseases', the following parasites: *Bacterium tabacum*, *Bact. angulatum*, *Cercospora nicotianae*, and by adding to the Second Schedule thereto, under the heading 'Insect Pests', the following insect pests:

Phthorimaea heliopa, *Bemisia* spp. (Colony and Protectorate of Kenya. *Official Gazette Supplement. Proclamations, Rules and Regulations, 1940. Supplement No. 9* (Proclamations, Rules and Regulations No. 7), Nairobi, February 6, 1940, p. 102).

Morocco (French Zone of). — An Order of April 5, 1940 authorizes the destruction of rabbits causing considerable damage to crops and plantations in some zones of the civil administrative area of Sefrou, (Fez). (*Bulletin Officiel*, Rabat, 19 avril 1940, XXIX^e année, n^o 1434, p. 400).

* * * An Order of May 1, 1940 authorizes the destruction of rabbits causing considerable damage to the crops and plantations in certain zones of the civil administrative area of Meknès-baulieue (environs). (*Ibid.*, 17 mai 1940, n^o 1438, p. 482).

Portugal. — 'Portaria' No. 9:527 of May 14, 1940 declares control of the following parasites compulsory: —

(a) in the 'concelho' of Coimbra: *Iridomyrmex humilis*, *Pseudococcus citri* and other scale insects, *Phytomonas syringae* and *Phytophthora hibernalis*, harmful to citrus; *Dacus oleae* and *Gloeosporium olivarum*, harmful to olive plants.

(b) in the 'concelho' de Lourinhã: *Carpocapsa* [Cydia] *pomonella*, *Fusicladium pirinum* and other parasites of Rosaceae. (*Diário do Governo*, Lisboa, 14 de maio de 1940, I série, núm. III, pág. 590).

Rumania. — Ministerial Decree No. 8,218, dated May 2, 1940, modifies the toxic content of the fungicides authorized by the Ministry of Agriculture and Domains for dry disinfection of seeds. (*Monitorul Oficial*, București, 8 mai 1940, anul CVIII, nr. 105, pag. 2172-2173).

Union of South Africa* — By Proclamation No. 48 of March 4, 1940, the Schedule to Proclamation No. 286 of 1936, as amended by Proclamation No. 155 of 1939 is amended by the deletion of sub-paragraph (c) of paragraph (2) of clause 4 [see this *Bulletin*, 1940, No. 1, p. 11].

Uruguay. — By Decree No. 214/940 of April 11, 1940, the scale insect *Epidiaspis pyricola* [*Diaspis leperii*] is declared a pest of national agriculture. (*Diario Oficial de la República Oriental del Uruguay*, Montevideo, 24 de abril de 1940, tomo 1939, núm. 10085, pág. 125-A).

* Communication from the Department of Agriculture and Forestry, Pretoria, Union of South Africa to the International Institute of Agriculture.

RECENT BIBLIOGRAPHY

- AFANASIEVA, O. V. On the influence of temperature and moisture on sex relations in parasitic Hymenoptera (*Trichogramma evanescens* Westw. a. *Pteromalus puparum* L.). *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 7, pp. 43-48. [Literature], p. 48. [In Russian, with title also in English].
- ARAÚJO, R. L. As "Joaninhas" uteis. *O Biológico*, S. Paulo, 1940, ano VI, n° 4, pags. 94-97.
[*Rodolia cardinalis*, *Cycloneda sanguinea*, *Azya luteipes*, *Pentilia egena*].
- AUTUORI, M. Um interessante metodo de aplicação do bisulfureto de carbono na extinção de formigueiros. *O Biológico*, S. Paulo, 1940, ano VI, n° 4, pags. 98-101, fig. 1.
- AYERS, T. T., LEFEBVRE, C. L., and JOHNSON, H. W. Bacterial wilt of lespedeza. *United States Department of Agriculture. Technical Bulletin No. 704*, Washington, D. C., 1939, 22 pp., 13 figs.
[*Phytomonas lespedezae* n. sp. on *Lespedeza stipulacea* and *L. stricta*. An English description of the new species is given].
- BAERG, W. J. Termite damage: preventives and remedies. *University of Arkansas. College of Agriculture. Agricultural Experiment Station. Bulletin No. 385*, Fayetteville, Arkansas, 1940, 27 pp., 11 figs. References, p. 25.
- BARZINSKY, R. M. On a new method of control of Orobanché. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 9, pp. 41-42. [Literature], p. 42. [In Russian, with title also in English].
- BEESON, C. F. C., and CHATTERJEE, S. N. Further notes on the biology of parasites of teak defoliators in India. *Indian Forest Records, New Series, Entomology*, Delhi, 1939, Vol. V, No. 5, pp. 355-379.
[Parasites of *Hapalia machaeralis*, *Hyblaea puera*, *Lygropia quaternalis* and *Sylepta* spp.].
- BENEDETTI, A. Per l'autarchia degli anticrittogamici. Sperimentazione sull'impiego del "Mercural" nella lotta contro il *Cycloconium oleaginum*. *L'Olivicoltore*, Roma, 1940, anno XVII, n. 6, pp. 11-17, figg. 1-2.
- BITANCOURT, A. A., e JENKINS, Anna E. Ciclo evolutivo de "Elsinoë australis Bitancourt & Jenkins," agente da verrugose da laranja doce. *Arquivos do Instituto Biológico*, São Paulo, 1939, vol. 10, pags. 129-146, est. 17-25. Bibliografia, pag. 142.
[With title and summary also in English:— 'Life history of *Elsinoë australis*, cause of sweet orange fruit scab'].
- BITANCOURT, A. A., e JENKINS, Anna E. "Elsinoë theae n. sp.", agente da verrugose do chá. *Arquivos do Instituto Biológico*, São Paulo, 1939, vol. 10, pags. 193-198, est. 28-29. Bibliografia, pag. 197.
[With title and summary also in English:— 'Elsinoë theae n. sp. causing scab of tea'].
- [BONDAR, Gregorio]. Estudo sobre a bacteriose da mandioca. *A Bahia Rural*, Bahia-Brasil, 1939, ano VII, ns. 71-72, pags. 263-265, 2 figs.
[*Bacillus manihoti*].
- BRAUN, Hederich und Ackersenf (*Raphanus raphanistrum* L. und *Sinapis arvensis* L.). *Biologische Reichsanstalt für Land- und Forstwirtschaft. Flugblatt Nr. 176*. Berlin 1940, 4 S., 6 Abb.

- BREIDER, Hans. Die Züchtung reblauswiderstandsfähiger Reben. *Die Umschau*, Frankfurt am Main 1939, Jahrg. 43, Heft 45, S. 984-988, Bilder 1-10. [*Phylloxera vastatrix*].
- BRUNO, Albert. Sur une nouvelle formule de bouillie cuprique. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1940, tome XXVI, n° 13, p. 454-457. [A mixture prepared by precipitating solutions of copper sulphate with trisodium phosphate].
- BUDDIN, Walter. The effect of hot-water treatment on Iris bulbs. *Journal of the Royal Horticultural Society*, London, 1939, Vol. LXIV, Pt. 9, pp. 425-428, figs. 97-98.
- CALDERÓN, S. Artrópodos nocivos existentes en El Salvador, América Central. *Revista de Agricultura Tropical*, San Salvador, C. A., 1938, tomo XII, n° 22, págs. 35 a 38.
- CALDWELL, N. E. H. Bean fly control in southern Queensland. *Queensland Agricultural Journal*, Brisbane, 1939, Vol. LII, Pt. 4, pp. 393-396, pl. 172. [*Agromyza phaseoli*].
- CASTILLO, Bernardo S., and CELINO, Martín S. Wilt disease of abacá, or Manila hemp (*Musa textilis* Née). *The Philippine Agriculturist*, Laguna, P. I., 1940, Vol. XXXIX, No. 1, pp. 65-85, figs. 1-5. Literature cited, pp. 84-85. [*Fusarium oxysporum* f. 3 (= *F. cubense*)].
- CHAMBERLAIN, E. E. Varieties of garden and field peas immune to pea-mosaic. *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 3 A, pp. 178 A-184 A. Literature cited, p. 183 A.
- CHATTERJEE, P. N. On the biology and morphology of *Apanteles machaeralis* Wlkn. (Braconidae, Hymenopt.). *Indian Forest Records*, New Series, Entomology, Delhi, 1939, Vol. V, No. 6, pp. 381-395, pl. I. Literature, p. 395. [*A. machaeralis* is an internal parasite of *Hapalia machaeralis*, a teak defoliator].
- CHILDS, James F. L. Diurnal cycle of spore maturation in certain powdery mildews. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 65-73, figs. 1-3. [*Erysiphe cichoraccarum*, *E. polygoni*, *Podosphaera leucotricha*, *Sphaerotheca pannosa*, *Oidium eionymi-japonici*].
- CHRISTOFF, Alexander. Crown gall on fruit trees in Bulgaria. *Zeitschrift der landwirtschaftlichen Versuchstationen in Bulgarien*, Sofia 1940, Jahrg. X, Heft 1, S. [3]-27, Abb. 1-2. [Literatur], S. 21-27. [In Bulgarian, with title and summary also in English. — *Phytoplasma tumefaciens*].
- CIFERRI, Raffaele. Problemi della produzione bananiera somala: un programma di lavoro. *Rivista di Biologia Coloniale*, Roma, 1940, vol. III, fasc. III, pp. [223] 234. [With titles and summaries also in French, English and German. — A scheme is proposed for biological experiments on banana cultivation in Italian Somaliland. This scheme will also include work on banana pests and diseases, together with preventive and control measures].
- COLLINS, C. W. The elm leaf beetle. *U. S. Department of Agriculture. Leaflet No. 184*, Washington, D. C., 1939, 6 pp., 3 figs. [*Galerucella xanthomelaena*].
- CORRADINI, Paola. Su un caso di albicatura a mosaico del gelso. *Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti*, Venezia, 1940, Anno accademico 1939-40, tomo XCIX, parte II: Cl. di scienze mat. e natur., disp. I, pp. [11]-26, tav. IV-X. Bibliografia, p. 26.
- COSTANTINO, Giorgio. Il « verme rosa » del cotone (« *Platyedra gossypiella* » Saunders) in Sicilia. *L'Italia Agricola*, Roma, 1940, anno 77, n. 7, pp. [487]-498, figg. 1-9.

- CURTIS, K. M. Control of tomato leaf-mould: the value of different sprays. *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 3A, pp. 187A-192A, figs. 1-3. References, p. 192A. [*Cladosporium fulvum*].
- DA COSTA LIMA, A. Como combater o gafanhoto sul-americano. Combate biológico na Argentina. Outros meios de combate. *Chacaras e Quintaes*, São Paulo, 1940, ano 31, vol. 61, num. 5, pags. [657]-660, 3 figs. [*Schistocerca paranensis*].
- DASTUR, Jehangir Fardunji. Stem breaking of cotton. *Agriculture and Live-stock in India*, Delhi, 1939, Vol. IX, Pt. VI, pp. 685-687, pls. XLIII-XLIV. [The direct cause of this disorder seems to be the blowing of wind at a high velocity for many days together].
- DUNEGAN, John C. Unusual bacterial spot symptoms on peach leaves. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 88-89, fig. 1. [*Bacterium pruni*].
- DUNEGAN, John C. A blight of wild cherry seedlings. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 89-90, fig. 1. [*Sclerotinia seaveri* on *Prunus serotina*].
- DYKSTRA, T. P. Report on potato virus diseases in 1938. *American Potato Journal*, Somerville and New Brunswick, N. J., 1939, Vol. 16, No. 8, pp. [204]-212. Literature cited, pp. 211-212. [A review of some of the papers published late in 1937 and in 1938].
- EGOROVA, I. I. Relation of ecotypes of lucerne to fungous diseases. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 8, pp. 37-[41]. [In Russian, with title also in English].
- EHRlich. Bekämpfung und Verhütung der Nadelholz - Insekten - Grossschäden. *Allgemeine Forst- und Jagd-Zeitung*, Frankfurt am Main 1940, 116. Jahrg., S. 188-190.
- ELSOOKOV, M. P. Basic problems for agricultural plant protection against pests and diseases during the five year plan. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 9-[14]. [In Russian, with title also in English].
- EVLAkHOVA, A. A. A new yeast-like fungus. *Blastodendron pseudococci* nov. sp., pathogenic for mealy bugs. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 79-[84], figs. 1-3. [Bibliography], p. [84]. [In Russian, with title also in English].
- EXT, W. Kohlweisslinge als Grossschädlinge in Kohl- und Steckrübenfeldern. *Deutsche Landwirtschaftliche Presse*, Berlin 1939, 66. Jahrg., Nr. 34, S. 420, Abb. 516-517. [*Pieris brassicae*].
- FALKENSTEIN, B. J. Realization of the problems of Great Volga and injurious rodents. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 24-[30], fig. 1. [Bibliography], p. [30]. [In Russian, with title also in English].
- FEDOTOVA, T. I. The determination of variety resistance to diseases by means of the serological method using a simplified type of reaction. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 85-[91], fig. 1. [Bibliography], p. [91]. [In Russian, with title also in English].
- FEDOTOVA, T. I., and KASPEROVITICH, Z. S. An accelerated method for the determination of seed bacterial contaminations of agricultural plants. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 92-[93]. [In Russian, with title also in English].

- FENTON, F. A. Control of shade tree borers. *Agricultural Experiment Station. Oklaoma Agricultural and Mechanical College. Experiment Station Circular No. 84*, Stillwater, 1939, 28 pp., 19 figs.
[*Chrysobothris femorata*, *Cyllene robiniae*, *C. caryae*, *Plectrodera scalator*, *Saperda tridentata*, *S. calcarata*, *Hypermallus villosus*, *Oncideres texanus*, *Agrilus bilineatus*, *Prinoxystus robiniae*, *Tremex columba*, *Camponotus herculeanus*].
- GALLEGO, F. L. El caculo de la caña de azúcar, del maíz y de otras gramíneas, de la caña brava, del cocotero y algunas plantas de ornato. *Revista «Facultad Nacional de Agronomía»*, Medellín-Colombia, S. A., 1939, año I, vol. I, n.º 1, págs. 43 a 52, 8 figs. Bibliografía, pág. 52.
[*Podischnus agenor* (fam. Scarabaeidae)].
- GARCÉS O., Carlos. Preliminares al estudio del chancro y la fusariosis del cacao. *Revista «Facultad Nacional de Agronomía»*, Medellín-Colombia, S. A., 1939, año I, Vol. I, n.º 1, págs. [61] a 118, láms. I-V. Autores consultados, págs. 117 y 118.
[*Phytophthora faberi* and a variety of *Fusarium orthoceras* (?)].
- GARDNER, C. A. A record of a new noxious weed, and a warning to farmers and settlers. Rapistrum weed (*Rapistrum rugosum* [L.] All.). *Journal of the Department of Agriculture of Western Australia*, Perth, 1939, Vol. 16 (Second Series), No. 4, pp. 441-444, 1 fig., 1 pl.
- GARTHWAITE, P. F., and DESAI, M. H. On the biology of the parasites of the teak defoliators, *Hapalia machaeralis* Walk. (Pyralidae) and *Hyblaea puera* Cram. (Hyblaeidae) in Burma. *Indian Forest Records*, New Series, Entomology, Delhi, 1939, Vol. V, No. 4, pp. [307]-353, figs. 1-7.
- GODFREY, G. H. Ecological specialization in the stem-and bulb-infesting nematode, *Ditylenchus dipsaci* var. *amsinckiae*. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 41-53, figs. 1-6. Literature cited, p. 53.
- GOLITZIN, S. V., et LEVINA, R. F. La récolte par le combine et les mauvaises herbes dans les champs. *Sovietskaia Botanika*, Moscou-Leningrad, 1940, n.º 1, p. [6]-26, fig. 1-3. [Bibliographie], p. 26.
[In Russian, with title also in French].
- GUTIÉRREZ, Herminio P. El piretro. *El Agricultor Venezolano*, Caracas, 1939, año IV, no. 40, págs. 34 a 37, 3 figs. Bibliografía, pág. 37.
[*Chrysanthemum cinerariaefolium*].
- HAMBLETON, E. J. Experiencias para combatir o percevejo "*Horcius nobilellus* (Berg)" do algodão. *Arquivos do Instituto Biológico*, São Paulo, 1939, vol. 10, pags. [207]-218, figs. 1-2. Bibliografía, pag. 218.
[With title and summary also in English:— 'Experiments for the control of the plant-bug *Horcius nobilellus* (Berg) on cotton'].
- HAMBLETON, E. J. Notas sobre os lepidopteros que atacam os algodoeiros no Brasil. *Arquivos do Instituto Biológico*, São Paulo, 1939, vol. 10, pags. [235]-248. Bibliografía, pags. 247-248.
[With title and summary also in English:— 'Notes on Lepidoptera affecting cotton in Brazil'].
- HARRISON, A. L. A method for testing resistance of tomatoes to *Fusarium* wilt. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 86-87, fig. 1.
[*Fusarium bulbigenum* var. *lycopersici*].
- HARTZELL, Albert, and MCKENNA, George F. Vertical migration of Japanese beetle larvae. *Contributions from Boyce Thompson Institute*, Menasha, Wisconsin, 1939, Vol. II, No. 1, Pt. 1, pp. 87-91, figs. 1-2. Literature cited, pp. 90-91.
[*Popillia japonica*].
- HARTZELL, Albert, and WILCOXON, Frank. Tests on certain organic compounds for control of adult Japanese beetle. *Contributions from Boyce Thompson Institute*, Menasha Wisconsin, 1939, Vol. II, No. 1, Pt. 1, pp. 83-86. Literature cited, p. 86.
[*Popillia japonica*].

- HRISAFI, Cornelia P. Contribuțiuni la sistematica și biologică coleopterului *Galerucella luteola* Müll. București 1940, 85 pag., 55 fig., 7 pl. Bibliografie, pag. [75]-84. [In Rumanian, with summary also in German].
- JAGGER, Ivan C. Brown blight of lettuce. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 53-64, figs. 1-5. Literature cited, p. 64. [A root parasite is suspected as the cause, although the striking similarity of brown blight to the soil-borne mosaic disease of wheat suggests the possibility of a similar nature].
- JANJUA, Nazeer Ahmed. A preliminary note on the bionomics and control of the black headed cricket (*Gryllulus domesticus* Linn.) in Usta Colony (Sibi District) of Baluchistan. *Agriculture and Live-stock in India*, Dehli, 1939, Vol. IX, Pt. VI, pp. 688-694, figs. 1-3.
- JANCKE, O. Knospenschäden durch *Rhynchites bacchus* L. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1940, 20. Jahrg., Nr. 4, S. [17]-19, Abb. 1-3. Schrifttum, S. 19.
- JANNONE, Giuseppe. Principali cause di natura animale riscontrate dannose all'agricoltura dell'Africa Orientale Italiana durante il 1939. *L'Agricoltura Coloniale*, Firenze, 1940, anno XXXIV, n. 5, pp. [177]-185, figg. 1-5; n. 6, pp. [241]-253, figg. 6-10; n. 7, pp. [287]-298, figg. 11-19.
- JAUCH, Clotilde. La "viruela de los frutales de carozo" en la Argentina. *Coryneum carpophilum* (Léveillé), nov. comb. *Revista Argentina de Agronomía*, Buenos Aires, 1940, tomo 7, n. 1, págs. 1 a 26, figs. 1-3, láms. I-VI. Bibliografía citada en el texto, págs. 24 y 25. Bibliografía consultada, págs. 25 y 26. [With summary also in English].
- JENKINS, Anna E., e BITANCOURT, A. A. Ilustrações das doenças causadas por "Elsinoë" e "Sphaceloma" conhecidas na América do Sul até Janeiro de 1936. *Arquivos do Instituto Biológico*, São Paulo, 1939, vol. 10, págs. [31]-60, est. 1-11. Bibliografia, págs. 54-59. [With title and summary also in English:— 'Illustrations of South American Elsinoë and Sphaceloma diseases known up to January, 1936'].
- JENKINS, Anna E., and BITANCOURT, A. A. An Elsinoë on *Toddalia*. *The Philippine Agriculturist*, Laguna, P. I., 1940, Vol. XXIX, No. 1, pp. 55-56. Literature cited, p. 56. [Elsinoë *toddaliae* on *Toddalia asiatica*].
- JEWETT, H. H. Control of sod webworms in lawns. *Kentucky Agricultural Experiment Station. University of Kentucky. Bulletin No. 391*, Lexington, Kentucky, 1939, pp. 89-106, figs. 1-4. Literature cited, p. 104. [*Crambus* spp.].
- JOHNSON, E. M., DIACHUN, Stephen, and VALLEAU, W. D. Experimental production of blackfire on tobacco. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 73-79, figs. 1-3. [*Bacterium tabacum*, *Bact. angulatum*].
- JOHNSON, J. Peter. Control of the Japanese beetle. *Connecticut Agricultural Experiment Station. Circular 132*, New Haven, 1939, 14 pp., 7 figs. [*Popillia japonica*].
- KALMBACH, E. R. The crow in its relation to agriculture. *U. S. Department of Agriculture. Farmers' Bulletin No. 1102*, Washington, D. C., 1939, 21 pp., 7 figs. [*Corvus brachyrhynchos brachyrhynchos*, *C. brachyrhynchos pascuus*, *G. brachyrhynchos paulus*, *G. brachyrhynchos hesperis*, *C. brachyrhynchos caurinus*].
- KAMENSKI, S. A., and PAIKIN, D. M. The cause of the several years hibernation of the beetles of the beet weevil. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 49-[54]. [Bibliography], [54]. [In Russian, with title also in English.— *Bothynoderes punctiventris*].
- KIMMEY, J. W. Time of growth of *Cronartium ribicola* cankers on *Pinus monticola* at Rhododendron, Oregon. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 80-85, figs. 1-2.

- KÖHLER, E. Uebertragung von Viruskrankheiten durch Insekten. *Die Umschau*, Frankfurt am Main 1939, Jahrg. 43, Heft 29, S. 680-682, Bilder 1-4.
- KREIBOHM DE LA VEGA, G. A. Métodos sencillos para notar la presencia de la oruga de la hoja en un algodonol («Alabama argillacea» Hübn.). *Revista Industrial y Agrícola*, Tucumán, 1939, tomo XXIX, núms. 4-6, págs. 107 a 114, figs. 1-7.
- LAFON, Max, et TEISSIER, Georges. Inanition et métamorphose chez *Tenebrio molitor*. *Comptes rendus des séances de la Société de Biologie et de ses filiales et associés*, Paris, 1939, tome CXXXI, n° 17, p. 417-420.
- LEBEDEV, F. K. Sur les propriétés biologiques de *Stellaria media* L. et la lutte contre elle. *Sovietskaia Botanika*, Moscou-Leningrad, 1940, n° 1, p. [63]-69, fig. 1-2. [Bibliographie], p. 69.
[In Russian, with title also in French].
- LEPAGE, H. S. O "bicho" do feijão. *O Biológico*, S. Paulo, 1940, ano VI, n° 4, págs. 87-93, figs. 2-3.
[*Acanthoscelides obsoletus*].
- LERCH, Viktor. Zur Bekämpfung des Schorfes (*Fusicladium*) der Obstbäume. *Deutsche Landwirtschaftliche Presse*, Berlin 1939, 66. Jahrg., Nr. 32, S. 396.
- LOOS, C. A. A blight of carrot leaves. *The Tropical Agriculturist*, Peradeniya, Ceylon, 1939, Vol. XCIII, No. 6, pp. 343-345, figs. 1-2. References, p. 345.
[*Macrosporium carotae*].
- LÜSTNER, Gustav. Krankheiten und Feinde der Obstbäume, Beerensträucher und des Strauch- und Schalenobstes. Ein Wegweiser für ihre Erkennung und Bekämpfung. Vierte Auflage. Stuttgart, Verlagsbuchhandlung Eugen Ulmer, [1939], 187 S., 191 Abb. M. 3. —
[The first three chapters of the fourth edition of this well-known handbook summarize all available data on the cultivation of fruit plants and give details on pest control.
The greater part of this volume is devoted to the concise and comprehensive description of the chief diseases and pests of the following fruit plants:—apple, pear, cherry, plum, apricot, peach, quince, loquat, walnut, hazel nut, gooseberry, black currant, raspberry, blackberry and strawberry].
- MACDONALD, J. A. Plant diseases of St. Andrews district. *Transactions and Proceedings of the Botanical Society of Edinburgh*, Edinburgh, 1939, Vol. XXXII, Pt. IV, pp. [556]-559. References, p. 559.
- MACFARLANE, Christina S. A rot of *Scilla* bulbs caused by *Penicillium cyclopium* Westling. *Transactions and Proceedings of the Botanical Society of Edinburgh*, Edinburgh, 1939, Vol. XXXII, Pt. IV, pp. [542]-547. References, p. 547.
- MALENOTTI, Ettore. Sulla lotta contro gli sprechi in fitoterapia. *Atti e Memorie della Accademia di Agricoltura Scienze e Lettere di Verona*, Verona, 1939, ser. V, vol. XVII (CXVII dell'intera collezione), pp. [77]-80, figg. 1-4.
- MALENOTTI, E[ttore]. Fitopatologia e sistema Del Pelo Pardi. *Atti e Memorie della Accademia di Agricoltura Scienze e Lettere di Verona*, Verona, 1939, ser. V, vol. XVII (CXII dell'intera collezione), pp. [123]-136.
- MALENOTTI, Ettore. Sul sotterramento delle esche per grillotalpe. *Bullettino dell'Agricoltura*, Milano, 1940, anno 74°, n. 30, p. [1].
[See also the article of Signor G. Provaglio in this Bulletin, 1940, No. 9, p. 176].
- MANOLACHE, C. Achantiophilus helianthi Rossi. *Viața Agricolă*, București 1940, anul XXXI, nr. 3, pag. [65]-67, fig. 1-6. Literatură, pag. 66-67.
[Injurious to the fruits of *Carthamus tinctorius*].
- MARCHIONATTO, Juan B. La «Rhizoctonia solani» y la «R. crocorum» en la República Argentina. *Universidad de Buenos Aires. Facultad de Agronomía y Veterinaria. Jornadas Agronómicas y Veterinarias 1939*. Buenos Aires, 1940, págs. [327] a 341, figs. 1-8, láms. I-IV. Bibliografía, pag. 341.

- MARCHIONATTO, Juan B. Las enfermedades de las dallas. *Anales de la Sociedad Rural Argentina*, Buenos Aires, 1940, año LXXIV, vol. LXXIV, n° 5, págs. 455 a 458, figs. 1-5.
[*Entyloma dahliae*, *Botrytis cinerea*, *Sclerotium rolfsii*, virus diseases ('mancha anular', mosaic disease, etc.)].
- MARÍN, Ignacio Herrera. Tres malezas que conviene combatir. *El Agricultor del Norte*, La Serena, 1939, año 25, n° 5, págs. 116 y 117.
[*Rumex acetosella*, *Carduus pycnocephalus*, *Carthamus lanatus*].
- MARKEVITCH, N. P. The overwintering and injuring by the snowy mould of the winter wheat ecotypes. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 119-[121]. [Bibliography], p. [121].
[In Russian, with title also in English. — *Fusarium nivale*].
- MCCALLAN, S. E. A., and WILCOXON, Frank. An analysis of factors causing variation in spore germination tests of fungicides. I. Methods of obtaining spores. *Contributions from Boyce Thompson Institute*, Menasha, Wisconsin, 1939, Vol. II, No. 1, Pt. 1, pp. 5-20, fig. 1. Literature cited, p. 20.
- MEIER, A. A., and KRIVODUBSKAJA, N. I. Methods for controlling *Botrytis anthophila* Bond. on red clover. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 125-[129]. [Bibliography], p. [129].
[In Russian, with title also in English].
- MEIER, N. F. Methods of mass multiplication of *Trichogramma evanescens* Westw. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 73-[76]. [Bibliography], p. [76].
[In Russian, with title also in English].
- MEJIA F., Ramón. Dormidera de la papa. *Revista «Facultad Nacional de Agronomía»*, Medellín-Colombia, S. A., 1939, año I, vol. I, n° 1, págs. 34 a 42. Autores consultados, pág. 42.
[A disease caused by *Fusarium oxysporum* or one of its varieties].
- MENOZZI, Carlo. Parassiti e predatori del *Conorrhynchus mendicus* Gyll. (Coleoptera-Curculionidae), dannoso alla bietola da zucchero in Italia, e loro importanza nella lotta biologica contro questo fitofago. VII. *Internationaler Kongress für Entomologie*. Berlin, 15.-20. August 1938. Weimar, Druck von G. Uschmann, 1939, S. [2561]-2575, Fig. 1-2.
- MINKIEWICZ, St. Some observations on the biology and the development of the codling moth. VII. *Internationaler Kongress für Entomologie*. Berlin, 15.-20. August 1938. Weimar, Druck von G. Uschmann, 1939, S. [2369]-2375.
[*Cydia pomonella*].
- MISCHENKO, L. L. On synonymics of the north-western race of the Asiatic locusts—*Locusta migratoria danica* L. (Orth., Acridioidea). *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 8, pp. 42-[43]. [Literature], p. [43].
[In Russian, with title also in English].
- MONTE, Oskar. Coleobrocas da mandioca. *O Biológico*, S. Paulo, 1940, ano VI, n° 1, págs. 15-18, figs. 1-4.
[*Coelosternus rugicollis*, *C. granicollis*, *C. manihoti*, *C. notaticeps*, *Eulechriops manihoti*].
- MOSTOVOJ, K. Zezelenání květu (virescence) jako příčina neplodnosti rostlin. *Sborník České Akademie Zemědělské*, Praha 1940, roč. XV, seš. 2, str. 142-146, obr. 1-11.
[In Czech, with title and summary also in German:— 'Das Vergrünen der Blüten als Ursache der Pflanzensterilität'].
- MUGGERIDGE, J. A maize and strawberry pest (*Clivina rugithorax* Putz.). *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 3A, pp. 184A-186A, figs. 1-2. References, p. 186A.

- MÜHLE, E. Zwei Laufkäfer als neue Schädlinge im deutschen Grasseamenbau. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1940, 20. Jahrg., Nr. 4, S. 19.
[*Amara plebeja*, *Diachromus germanus*].
- MÜLLER, Albert S. Marchitez y podredumbre de papas causadas por *Sclerotium Rolfsii* Sacc. *El Agricultor Venezolano*, Caracas-Venezuela, 1940, año IV, nos. 45-46, págs. 19 y 20.
- NAUMOVA, N. A. The infection of potatoes by *Phytophthora infestans* D. B. from diseased tubers. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 94-[102]. [Bibliography], pp. 101-[102].
[In Russian, with title also in English].
- NICOLAS, G[ustave], et AGGÉRY, [Berthe]. Sur quelques *Peronospora* parasités par des bactéries. *Revue de Mycologie*, Paris, 1940, tome V (n. s.), fasc. 1, p. [14]-19.
[*Peronospora trifoliorum*, *P. viciae*, *P. parasitica*].
- NIKLAS, O.-F. Biologische Bekämpfung der Orangenschildlaus im Mittelmeergebiet. *Die Umschau*, Frankfurt am Main 1939, Jahrg. 43, Heft 27, S. 638-639, Bilder 1-2.
[*Symphorobius amicus*, a natural enemy of *Pseudococcus citri*].
- OGAWA, Masayuki. On the diseases of castor oil plants in Formosa. *The Formosan Agricultural Review*, Taihoku, Taiwan, Nippon, 1940, Vol. 36, No. 6, pp. [507]-524, pls. I-IV. [Literature], pp. 521-523.
[In Japanese, with title also in English].
- ORLOV, S. P. Rétablissement de la pomme de terre dégénérée du Midi dans le Nord. *Sovietskaia Botanika*, Moscou-Leningrad, 1940, n° 1, p. [57].
[In Russian, with title also in French].
- OSTERWALDER, A. Zur Bekämpfung der Kräuselkrankheit der Pflirsche. *Schweizerische Zeitschrift für Obst- und Weinbau*, Wädenswil 1940, 49. Jahrg., Nr. 16, S. 278-281, Abb. 1-2.
[*Taphrina deformans*].
- PAILLLOT, A. L'organisation de la lutte contre la cochenille et l'eudémis de la vigne. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1940, tome XXVI, n° 6, p. 189-193.
[*Clypea ambiguella* and *Polychrosis botrana*].
- PEGLION, Vittorio. Lesioni meccaniche e medicatura del frumento da semina, cause di ingenti perdite di sementa e direttive per ovviarvi. *I Georgofili. Atti della R. Accademia dei Georgofili*, Firenze, 1940, sesta serie, vol. VI, disp. 2ª, pp. [213]-224. Bibliografia, p. 224.
- PETERSON, R. F. Inheritance of resistance of H-44 and Hope wheats to stem rust. *The Journal of Heredity*, Washington, D. C., 1940, Vol. XXXI, No. 6, p. 272. Literature cited.
[*Puccinia graminis tritici*].
- POISSON, Raymond. Sur la biologie de *Myzodes (Myzus) persicae* Sulz. (Hémiptère Phytophthire Aphididae) en Bretagne. *Comptes rendus hebdomadaires des séances de l'Académie des Sciences*, Paris, 1940, tome 210, n° 8, p. 312-314.
- POLIAKOV, I. J. Data on the ecology of *Lagurus lagurus* Pall. in the vicinity of Aktyubinsk. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 31-[37]. [Bibliography], p. [37].
[In Russian, with title also in English].
- POLIAKOV, J. M. A new fungicide of complex action. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 60-[72].
[In Russian, with title also in English].

POPOV, D. V. Determination of the concentration of polysulphides of barium in solutions according to specific weight. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 9, pp. 38-[40], figs. 1-2. [In Russian, with title also in English].

POSPELOVA, V. M. The tests of concentrating baits as a control measure against *Agriotes obscurus*. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 38-[43], fig. 1. [Bibliography], p. [43]. [In Russian, with title also in English].

PRICE, W. C. Thermal inactivation rates of four plant viruses. *Archiv für die gesamte Virusforschung*, Wien 1940, Bd. I, Heft 3, S. [373]-386, figs. 1-2. Bibliography, S. 385-386. [Tobacco-necrosis virus, tobacco-mosaic virus, alfalfa-mosaic virus, tobacco-ringspot virus].

REDDICK, Donald, and MILLS, W. R. Blight immune versus blight resistant potatoes. *American Potato Journal*, Somerville and New Brunswick, N. J., 1939, Vol. 16, No. 8, pp. 220-224. [*Phytophthora infestans*].

RODRIGUES, Celso. Sobre o combate aos ratos mediante o uso da « Salmonella typhi-murium ». *O Biologico*, S. Paulo, 1940, ano VI, nº. 1, pages. [19]-20.

ROLAND, G. Essais de désinfection des graines de betteraves, effectués en 1938. *Publications de l'Institut Belge pour l'Amélioration de la Betterave*, Tirlemont, 1939, 7^{me} année, nº 5, p. [543]-547. [With titles and summaries also in Flemish, German and English. — *Phoma betae*].

SABUROVA, P. V. Anatomico-morphological changes in wheat spikes infected with *Ustilago tritici* (Pers.) Jens. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 111-[118], figs. 1-4. [Bibliography], p. [118]. [In Russian, with title also in English].

SALA, Giovanni. Protezione del legno e autarchia. *I Georgofili. Atti della R. Accademia dei Georgofili*, Firenze, 1940, sesta serie, vol. VI, disp. 2^a, pp. [156]-192, figg. 1-25, 1 tav. Bibliografia, pp. 191-192. [A detailed treatise on damage caused to wood by plant and animal parasites and relative control measures].

SANDU-VILLE, C., și HULPOI, A. Resistența câtorva soiuri de grâu la infecțiunea cu mărură. *Viața Agricolă*, București, 1940, anul XXXI, nr. 2, p. 37-40. [*Tilletia*].

SAUER, H. F. G. Biologia de "Calliephialtes dimorphus Cushman." (Hym. Ichm.), um interessante parasita primario da "Platyedra gossypiella (Saunders)". *Arquivos do Instituto Biologico*, São Paulo, 1939, vol. 10, pages. [165]-192, figs. 1-7, est. 27. [With title and summary also in English:— 'Biology of Calliephialtes dimorphus Cushman. (Hym. Ichm.), an interesting primary parasite of Platyedra gossypiella (Saunders)'].]

SAUER, H. F. G. Notes sobre "Elasmopalpus lignosellus Zeller" (Lep. Pyr.), séria praga dos cereais no Estado de São Paulo. *Arquivos do Instituto Biologico*, São Paulo, 1939, vol. 10, pages. [199]-206, est. 30-31. [With title and summary also in English:— 'Notes on Elasmopalpus lignosellus Zeller (Lep. Pyr.), a serious pest of cereal crops in the State of S. Paulo'].]

SCHULTZ, Enrique F. La mariposa de las naranjas (« Gymnandrosoma » sp.). *Revista Industrial y Agrícola*, Tucumán, 1939, tomo XXIX, núms. 4-6, págs. [87] a 90.

SHEK, G. On the control of *Pseudococcus citri* Risso in Azerbaidjan. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 58-[59], fig. 1. [Bibliography], p. [59]. [In Russian, with title also in English].

- SHEVELEV, I. N., and DOBROHLEB, I. F. *Agropyron repens* P. B. and methods of its control. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 9, pp. 11-[14]. [Literature], p. [14].
[In Russian, with title also in English].
- SHULL, A. Franklin. Adult intermediate-winged aphids not physiologically intermediate. *Genetics*, Menasha, Wisconsin, 1940, Vol. 25, No. 3, pp. [287]-298. Literature cited, p. 298.
[*Macrosiphum solanifolii*].
- SIEBENMANN. Über das Auftreten der Tannentrieblaus in den Stadtwaldungen von Zofingen. *Schweizerische Zeitschrift für Forstwesen*, Bern 1939, 90. Jahrg., Nr. 6, S. 190-192.
[*Dreyfusia nüsslini*].
- SILBERSCHMIDT, K., e KRAMER, M. A disseminação do mosaico do fumo no campo. *Arquivos do Instituto Biológico*, São Paulo, 1939, vol. 10, pages. [61]-72, fig. 1, est. 12. Bibliografia, pages. 71-72.
[With title and summary also in German: — 'Über die Ausbreitung des Tabakmosaiks im Feld'].]
- SILVESTRI, F[ilippo]. La lotta biologica contro le mosche dei frutti della famiglia Trypetidae. VII. *Internationaler Kongress für Entomologie*. Berlin, 15.-20. August 1938. Weimar, Druck von G. Uschmann, 1939, S. [2396]-2418.
[*Ceratitis capitata*, *Strumeta cucurbitae*, *Daculus oleae* (syn. *Dacus oleae*), *Anastrepha* spp.].
- SIMMONDS, J. H. Influence of seasonal conditions on the development of *Cercospora* leaf spot of the banana, with special reference to the control programme. *Queensland Agricultural Journal*, Brisbane, 1939, Vol. LII, Pt. 6, pp. 633-647, pls. 264-265. References to literature, p. 647.
[*Cercospora musae*].
- SIRRI, A. Le Sezioni fitopatologiche presso gli Ispettorati. *Giornale di Agricoltura della Domenica*, Roma, 1940, anno L, n. 32, p. 272.
[Concerns the establishment of Phytopathological Sections attached to the Provincial Inspectorates of Agriculture in Italy].
- SMITH, Floyd F. Control of cyclamen and broad mites on gerbera. *United States Department of Agriculture. Circular No. 516*, Washington, D. C., 1939, 14 pp., 9 figs.
[*Tarsonemus pallidus* and *T. latus* on *Gerbera jamesoni*].
- SMITH, W. P. Cass. Brown spot, a serious disease of the passion vine. *Journal of the Department of Agriculture of Western Australia*, Perth, 1939, Vol. 16 (Second Series), No. 4, pp. 445-450, pls. I-IV. References, p. 450.
[*Alternaria passiflorae*].
- SONAN, Jinhaku. On the insect pests of the flax in Formosa. *The Formosan Agricultural Review*, Taihoku, Taiwan, Nippon, 1940, Vol. 36, No. 6, pp. 577-586, 1 fig.
[In Japanese, with title also in English].
- STAPP, C. Der Pflanzenkrebs und sein Erreger *Pseudomonas tumefaciens*. IX. Mitteilung. *Daphne mezereum* L. als weitere neue Wirtspflanze. *Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, II. Abt., Jena 1940, 102. Bd., Nr. 15/17, S. 295-300, Abb. 1. Literatur, S. 300.
- STĘPNIEWSKA, Klementyna. Ein Beitrag zur Biologie der Apfelsägewespe *Hoplocampa testudinea* Klug in Polen. VII. *Internationaler Kongress für Entomologie*. Berlin, 15.-20. August 1938. Weimar, Druck von G. Uschmann, 1939, S. [2436]-2438, Taf. 246-247.
- SYRE. Neue Beiträge zur Kenntnis der Silberschorfkrankheit der Kartoffel. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1940, 20. Jahrg., Nr. 4, S. 20. Angeführtes Schrifttum.
[*Spondylocladium atrovirens* and *Colletotrichum atramentarium*].

- SWAN, D. C. The lucerne flea: its life history and control in South Australia. *The Journal of the Department of Agriculture of South Australia*, Adelaide, 1940, Vol. XLIII, No. 6, pp. 462-471, figs. 1-4. Bibliography, p. 471. [*Smynturus viridis*].
- TARASSOV, V. M. The chemical method of control measures of agricultural pests and diseases in the III five year plan. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 15-[23]. [In Russian, with title also in English].
- TARCHI, Angelo. Nuovi parassitici, germicidi e stimolanti della germinazione e della emissione di radici. *I Georgofili. Atti della R. Accademia dei Georgofili*, Firenze, 1940, sesta serie, vol. VI, disp. 2^a, pp. [193]-212.
- TCHERNISHOV, P. K. About rate of contamination of grains by pests. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 46-[48]. [In Russian, with title also in English].
- TELENGA, N. A. Testing *Trichogramma evanescens* Westw. for the control of *Laspheyresia funebrana* Tr. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 77-[78]. [In Russian, with title also in English].
- THIEM, H. Neuere Ergebnisse auf dem Gebiete der Schädlingsbekämpfung im Obstbau. *Die kranke Pflanze*, Dresden 1939, 16. Jahrg., Heft 9/10, S. [151]-155; Heft 11/12, S. 178-192; 1940, 17. Jahrg., Heft 1/2, S. 5-8.
- TILIER, L. W., and COOPER, E. R. X-ray detection of mouldy-core in the Delicious apple. *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 3 A, pp. 168 A-169 A, fig. 1.
- TOPI, Mario. La ricostituzione antifillosserica in Chianti. *Agricoltura Senese*, Siena, 1940, anno LXXXVI, n. 6, pp. 8-10. [*Phylloxera vastatrix*].
- TROPOVA, A. T. The affection of the vegetative organs of wheat by the loose smut, *Ustilago tritici* (Pers.) Jens. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 122-[124], figs. 1-4. [Bibliography], p. [124]. [In Russian, with title also in English].
- TYLER, Leon J., PARKER, K. G., and POPE, Seth. Relation of wounds to infection of American elm by *Ceratostomella ulmi*, and the occurrence of spores in rainwater. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 1, pp. 29-41. Literature cited, p. 41. [*Ceratostomella ulmi* on *Ulmus americana*].
- UPHOF, J. C. Th. Enfermedades de los árboles producidas por las heridas. *El Agricultor Venezolano*, Caracas-Venezuela, 1940, año IV, nos. 45-46, págs. 28 y 29.
- VALPASSOS, Oswaldo. A gomóse das laranjeiras. *A Bahia Rural*, Bahia-Bresil, 1939, ano VII, ns. 71-72, pag. 262. [*Phytophthora citrophthora*, *Phyt. parasitica*].
- VAN NES. Bekämpfung und Verhütung der Nadelholz- Insekten- Grossschäden. *Allgemeine Forst- und Jagd-Zeitung*, Frankfurt am Main 1940, 116. Jahrg., S. 25-28.
- VASILIEV, J. V. Origin and world distribution of *Bruchus pisorum* L. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 44-[45], fig. 1. [In Russian, with title also in English].
- VASSEUR, R. E. On the biology of *Pulvinaria aurantii* Ckll. in Abkhasia. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 55-[57]. [In Russian, with title also in English].
- VENGIS, Jonas. Praktische Auswirkungen der Viruskrankheiten bei Kartoffeln. Inaugural-Dissertation. Bonn, Druck Hch. Ludwig, 1939, 63 S., 1 Abb. Schrifttum, S. 61.

- VLADIMIRSKAJA, M. E. A parasite of crop plant rust, *Tuberculina persicina* (Ditm.) Sacc. *Bulletin of Plant Protection*, Moscow and Leningrad, 1939, No. 1 (20), pp. 103-[110], 1 graph. [Bibliography], p. [110].
[In Russian, with title also in English].
- WAGER, Vincent A. *Alternaria citri* and the November-drop problem of Washington navel oranges in the Kat River Valley. *Union of South Africa. Department of Agriculture and Forestry (Plant Industry Series No. 46). Science Bulletin No. 193*, Pretoria, 1939, 18 pp., 2 figs. Literature cited, p. 18.
- WAKSMAN, Selman A. On the classification of Actinomycetes. *Journal of Bacteriology*, Baltimore, U. S. A., 1940, Vol. 39, No. 5, pp. 549-558. References, p. 558.

Prof. UGO PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

ITALIAN EAST AFRICA.

Notes on the geographic Distribution and Biology of *Epilachna* (*Solanophila*) *canina* var. *scioana* and subsp. *vulpecula* †

During his mission in Scirè in March, 1940, Dr. Renzo Candussio of the Agricultural Bureau of Eritrea, had occasion to collect numerous specimens of a lady-bird beetle, *Epilachna* (*Solanophila*) *canina* F., found in the adult state. The specimens in question, pertaining for the most part to the variety *scioana* Sicard (Capra, *in litt.*) having tawny pronotum and legs, and to a small extent to the subspecies *vulpecula* Reiche, having the same parts black instead of tawny, were observed in large numbers in the anfractuosités of trunks of old olive trees near the convent of Amba Enda Gheorghis (altitude 2310 m.) and in the cavities of the large rock formations on the Gamma Mount (altitude 2100 m.) near Az Darò, in Adi Abò. According to the information given by the native monks of the Enda Gheorghis convent, these adults collect in numerous groups after the rains (towards November) and remain thus up to May. In Scirè, these beetles are only found (still according to the same source of information, near the Enda Gheorghis convent and Coiezà; however, it may easily be imagined that their geographic distribution is not restricted. The native name of *E. (S.) canina* in the region is 'tuhan Deghenà' (Deghenà 'bug') derived from a native legend.

This species may be considered as widespread in many parts of the upper and middle plateaux of the Ethiopian highlands, often spreading to the lower zones. Referring to a paper published in December, 1939 by Dr. Felice Capra of the Civic Museum of Natural History, Genoa, on the Coccinellidae collected by Professor E. Zavattari in the Borana Territory, I. E. A., I may point out that this beetle, as the *scioana* variety and as another variety representing a transitory form between *scioana* and the subspecies *vulpecula*, was found in different localities of south-western Ethiopia, for example, Malca Guba, Arero, Javello, Moyale and Mega from the beginning of April to the beginning of May, 1937. Capra, in his paper mentions the specimens from Scioa and Eritrea in the collec-

* Under this and the next heading the countries are arranged in French alphabetical order.

† Communication from Dr. GIUSEPPE JANNONE, Section of Entomology and Agricultural Zoology, Centre of Agricultural and Zootechnical Research for Italian East Africa, Addis Abeba, transmitted to the Institute by Professor ANTONIO DE BENEDECTIS, Director of the Centre.

tions of the Civic Museum of Natural History at Genoa, other specimens from Kilimanjaro, between Tanganyika and Kenya, and others in the Sicard Collection in the Paris Museum; in the latter case, the place of origin is not indicated, but is probably Scioa, as the name given to the variety by Sicard is *scioana*.

During my mission in Uollo Jeggiu, I. E. A. from May 6 to 13, 1940, for the study and control of another lady-bird beetle, which had caused serious damage to barley crops, on May 8, I had occasion to visit a long and deep valley going towards the Tarchià river, along the road from Dessiè to Debra Tabor and on to Gondar, and on May 10, the Batiè plain, along the Dessiè-Sardò road, where I found many species of Coccinellidae in the adult state feeding on the leaves of some wild plants. In the zone visited on May 8, I also found *E. (S.) canina* very widespread, not only in the adult state, but also eggs, larvae in all stages of development and pupae. Therefore as regards its general geographic distribution, it may be affirmed that this lady-bird beetle, with different typical subspecies, varieties and transitory forms, extends over a vast zone of East Africa, from the north-west of Tanganyika almost up to the west coast of the Red Sea.

There are no substantial differences in the life history, habits and feeding in the different states, damage caused, etc., between this *Epilachna* and other species of Epilachninae, a group of phytophagous Coccinellidae, and in particular, *E. chrysomelina* F., which in Italy and in other countries attacks Cucurbitaceae (melon, watermelon, etc.), but which can also live on cotton and sesame, as has been observed in some African regions. I saw *E. (S.) canina* on a wild creeping cucurbit, *Cucumis dipsaceus* Ehrenb., which flourishes in fairly warm regions where water is plentiful, and on other species of *Cucumis* in Eritrea, Amara and Scioa. I myself have never seen it on cultivated Cucurbitaceae. The insect also attacks the leaves of different wild Solanaceae, but here again I have not seen it on cultivated species. It would be advisable, however, to observe Cucurbitaceae and Solanaceae cultivated near zones where wild plants of the same families are attacked by this *Epilachna*, because in my opinion the wild plants alone would not provide sufficient food in the larval and adult states.

The eggs are deposited in small groups on the leaves, and the larvae live either on the upper or the lower surface of the leaf, gnawing one or the other. The surface opposite that which has been eaten becomes skeleton-like and soon withers. Pupating also takes place on the leaves or else on the stems of the infested plants.

This species, in the adult state goes through a period of rest during the months of October, November, December, January, February, March and part of April, in the cracks of the bark of old trees, at the base of shrubs, in rock fissures, under stones and in any other place which is sheltered from rain, wind and attack by other larger species living in the same area. In general, it may be said the insects never hibernate separately but always in more or less large groups. In the good season, that is when plant growth begins with the coming of the small or heavy rains (March-April or June-July), these adults leave their shelters and go onto the leaves, where after pairing, the eggs are deposited, producing 2-3-4 generations according to when the insects made their appearance,

depending on the beginning of the small rains and their continuance and on the commencement of the heavy rains. As is seen, therefore, the period of activity of the insect is the season of small and heavy rains, while the dry season, when many plants of the wild herbaceous flora of the Ethiopian uplands are withered is the rest period.

The months of the year during which *E. (S.) canina* goes through the different states of development correspond almost exactly with those of the life history of Epilachninae in temperate zones; the only difference is the diversity in the climatic phases which take place during these months, phases which act in the same manner on the biological determinism of Epilachninae in general. Thus, the warm season in the temperate regions has the same effect as the rainy season in the Ethiopian uplands, while the cold season of the former corresponds to the dry season of the latter. Temperature and rainfall, therefore, appear to correspond with a certain constancy on the biological determinism of some insects.

SWITZERLAND.

Spread of the Colorado Beetle in the Country *

Infestation by the Colorado beetle (*Leptinotarsa decemlineata*) has continued in the last few months.

The situation in French Switzerland on August 1, 1940 may be summarized as follows:—

| Cantons | Communes infested | | | Foci reported | | |
|------------------------|-------------------|---------|---------|------------------|------------------|---------|
| | 31-7-39 | 30-9-39 | 31-7-40 | 31-7-39 | 30-9-39 | 31-7-40 |
| Geneva | 41 | 42 | 40 | 2,300 | 3,500 | spread |
| Vaud | 359 | 376 | 247 | 5,300 | 20,239 | 2,926 |
| Neuchâtel | 60 | 61 | 48 | 2,300 | 2,800 | 277 |
| Bernese Jura | 110 | 143 | 100 | 3,500 | 5,000 | spread |
| Fribourg | 169 | 203 | 72 | 1,350 | 1,528 | 546 |
| Valais | 16 | 20 | 10 | 36 | 45 | 53 |
| Total | 755 | 845 | 517 | 15,000 approx | 33,000 approx | — |

If these figures are compared with those of last year on August 1, it is seen that infestation of French Switzerland is not so serious as was expected. The very wet and cold autumn and winter of last year probably killed off a certain number of hibernating adults, especially in heavy and compact soils.

* Communication from the Federal Experiment and Seed Control Station, Lausanne (Mont-Calme), Switzerland.

* Mon. 11 Ingl.

The frequent rains and low temperatures of June and July 1940, adversely affected not only control operations but also the development of the parasite itself. Although the emergence of the hibernating insects (1st emergence) took place very early (in April), the first generation developed slowly from mid-May to the end of July. In practically all infested areas, the adults of the first generation are only emerging from the ground now (2nd emergence of the year), when they should have made their appearance during the first fortnight of July.

The eggs hatched irregularly; many foci only contained one or two larvae.

It must not be thought, however, that the situation is good everywhere. Some communes, even certain cantons, are so badly infested that it is no longer possible to indicate, even approximately, the number of foci. The foci are already undistinguishable and the larvae are very widespread in practically all the potato fields. Moreover, owing to mobilization and the delay in field operations because of insufficient labour, many foci have certainly been missed. Others have been destroyed and not reported. Undoubtedly, the number of actual foci is much higher than that reported.

In the canton of Geneva, the Plaine de l'Orbe, the Vallée de Délemont, infestation, much heavier than the previous years, is gradually becoming widespread. Other parts of the cantons of Vaud (Broye, Rhône plain), Neuchâtel (Chaux-de-Fonds, Le Locle) and Fribourg (Lac district) are also seriously infested, while a fairly large number of communes situated between these regions are still practically untouched. In Pays d'Enhaut and in Valais, on the other hand, as yet infestation is slight.

Despite the many difficulties, scholars were able to carry out surveys practically everywhere as usual. These surveys have again proved their utility in that approximately 80 per cent. of the foci were discovered, making it possible to establish more exactly the true extent of infestation in the country.

The first control operations have already been carried out. By limiting spraying to the foci and the immediate surroundings (localized treatments), a considerable economy in material has been realized, while at the same time, effective control is obtained.

In German Switzerland, infestation is still sporadic, the position being more or less the same as that two years ago. The less numerous foci could usually be counted. In some cantons (Solothurn, Aargau), however, the foci increased, and some communes have also been invaded to some extent. As shown in the following table, the Colorado beetle is advancing towards Graubünden; another canton, Glarus, is invaded. On the other hand, up to the present, no focus has been reported in Obwalden and Zug, which were contaminated last year.

The situation in German Switzerland on August 1, 1940 is summarized in the table on the following page.

The recent warm weather has stimulated the second generation. Many beetles will emerge from larvae spread over different areas and unnoticed. All these adults, some of which will spread to regions as yet free from this pest,

constitute a serious danger to next year's plantings. Therefore, it is more than ever necessary to continue control operations without cease and to destroy as many of the beetles as possible before they hibernate.

| Cantons | Communes infested | | | Foci reported | | |
|------------------------|-------------------|---------|---------|---------------|---------|---------------|
| | 31-7-39 | 30-9-39 | 31-7-40 | 31-7-39 | 30-9-39 | 31-7-40 |
| Zurich | 28 | 37 | 89 | 39 | 56 | 562 |
| Bern | 128 | 259 | 142 | 525 | 1,770 | 905 |
| Luzern | 37 | 44 | 40 | 113 | 886 | 133 |
| Schwyz | 1 | 1 | 2 | 1 | 1 | 2 |
| Obwalden | 1 | 1 | 0 | 1 | 1 | 0 |
| Zug | 3 | 5 | 0 | 6 | 9 | 0 |
| Solothurn | 82 | 103 | 82 | 283 | 1,478 | 740 |
| Basel-Stadt | 2 | 3 | 2 | 21 | 33 | 91 |
| Basel-Land | 52 | 53 | 68 | 247 | 319 | 1,284 |
| Schaffhausen | 4 | 6 | 18 | 4 | 6 | 751 |
| St. Gallen | 2 | 16 | 11 | 4 | 26 | 22 |
| Aargau | 109 | 119 | 202 | 444 | 585 | 2,600 |
| Thurgau | 1 | 4 | 6 | 1 | 6 | approx. 6 |
| Glarus | 0 | 0 | 3 | 0 | 0 | 5 |
| Total | 450 | 651 | 665 | 1,680 | 5,176 | 7,101 approx. |

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany. — By Ordinance of January 23, 1940, the Chief of the Corporation of Agriculture ('Reichsbauernführer') urges all agricultural officers and representatives to take a keen interest in measures regarding bird protection. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, Anfang Juli 1940, 20. Jahrg., Nr. 7, S. 39).

*** A Circular of February 8, 1940 informs those concerned that, through the initiative of the organization known as the 'Labour Front', lists of specialists in disinfection problems and in the control of noxious insects have been established at Berlin. These specialists, in case of emergency, will be placed at the disposition of the military and civil authorities.

Provincial lists have been drawn up on the same lines in different parts of the country. (*Ibid.*, S. 38-39).

*** The Minister of Agriculture published on April 22, 1940, the rules to be followed in the application of the 'Cartox', process, based on the use of a mixture of ethylene oxide and carbonic acid.

The rules are similar to those established by Decree of August 25, 1938 relative to the use of ethylene oxide [see this *Bulletin*, 1939, No. 2, pp. 28-29]. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juli 1940, Bd. XII, Nr. 4, S. 77-78).

*** The Ministers of Agriculture and of the Interior published on April 29, 1940, the regulations regarding the use of movable disinfection chambers, regulations established by Decree of May 6, 1936, modifying the provisions relative to the utilization of virulent poisons [see this *Bulletin*, 1936, No. 8, p. 173]. (*Ibid.*, S. 78-79).

*** By Decree of May 23, 1940, the provisions of the Decree dated July 1, 1938 relative to the control of the musk rat [*Fiber zibethicus*: see this *Bulletin*, 1938, No. 12, p. 270] have been extended to former Austria (Ostmark) and to the Sudeten districts (Sudetenland). (*Ibid.*, S. 76).

*** In an Ordinance, dated May 23, 1940, the Minister of Agriculture gives a list of the grape varieties used as stocks, which are authorized for cultivation in Prussia. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Nr. 7, S. 38).

*** By virtue of the agreements reached at Buenos Aires on occasion of the International Postal Congress, consignments by post of predatory insects and other enemies of pests are authorized. All consignments of this type, however, before being dispatched, must be authorized by the 'Biologische Reichsanstalt' at Berlin-Dahlem, which will also indicate the type of packing to be adopted. (*Ibid.*, S. 39).

*** By Circular of July 9, 1940 relative to the control of the Colorado beetle [*Leptinotarsa decemlineata*], the Minister of Agriculture notifies the communes that every care must be taken in storing the apparatus and control material placed at their disposition, in order to avoid any loss or damage. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, Anfang August 1940, 20. Jahrg., Nr. 8, S. 47).

Germany (Protectorate of Bohemia and Moravia). — By Decree of 29 February, 1940, the provisions in force relative to the protection of fruits and vines, have been revised and supplemented. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juli 1940, Bd. XII, Nr. 4, S. 85-87).

*** In the control of animal pests, in particular, rats and mice, Decree of June 6, 1940 prohibits the preparation and use of bait containing virulent germs which might result in the spread of some disease. (*Ibid.*, 1. September 1940, Nr. 5, S. 104-105).

Germany (Oldenburg). — By Decree of May 24, 1940, the control of the corn weevil [*Calandra granaria*] is made compulsory for all persons owning grain stocks or engaged in the utilization of these cereals for the preparation of food-stuffs and stock-feeds. The persons in question will have to carry out the instructions which will be given them by the Plant Protection Service. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juli 1940, Bd. XII, Nr. 4, S. 80).

Germany (Ostmark). — By Decree of December 2, 1939, the attributions and functions regarding the regulations on imports, exports and transit in former Austria, according to the resolutions adopted at the International Phylloxera Convention of November 3, 1881, have been taken over by the Minister of Agriculture of the Reich. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, Anfang Juli 1940, 20. Jahrg., Nr. 7, S. 39).

Germany (Saxony). — By Decree of May 22, 1940, the control of asparagus rust [*Puccinia asparagi*] is made compulsory in certain districts, which are indicated, of the country. The provisions are the same as those in force in Thuringia by virtue of the Decree of February 1, 1939 [see this *Bulletin*, 1939, No. 7, pp. 160-161]. The date, however, before which the haulms must be removed, after having cut any asparagus tops remaining in the field, has been changed to April 15 of each year. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juli 1940, Bd. XII, Nr. 4, S. 81-82).

Germany (Württemberg). — Decree of March 15, 1940 relative to the protection of bees prohibits the use of preparations containing arsenic and copper in spraying fruit trees and other horticultural and agricultural plants, particularly colza and asparagus crops, during the flowering season.

Trees near bee-hives should only be treated in the evening after the bees have returned to the hives and after having come to an agreement with the farmer in question.

This interdiction does not apply to vines, potatoes and hops, nor to plants grown for experimental purposes. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. Juli 1940, Bd. XII, Nr. 4, S. 82-83).

Italy. — Ministerial Decree of July 5, 1940 authorizes hunting and capture of wild rabbits, declared pests in part of the province of Littoria. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 13 luglio 1940, anno 81^o, n. 163, pp. 2584-2585).

**. A Ministerial Decree of July 8, 1940 establishes the modalities regarding the import, as an exceptional measure, from abroad, of potatoes intended solely for planting in the 1940-41 season. (*Ibid.*, pp. 2585-2587).

**. Ministerial Decree of August 14, 1940, authorizes the hunting and capture of rooks, hooded crows and jackdaws, declared pests in the Province of Agrigento. (*Ibid.*, 23 agosto 1940, anno 81^o, n. 197, p. 3141).

Mexico. — By 'acuerdo' of August 4, 1939, the control of the 'chapulín' (*Melanoplus* sp.) is declared necessary in the States of Aguascalientes and Zacatecas. (*Diario Oficial*, México, 12 de septiembre de 1939, tomo CXVI, núm. 10, pág. 2).

*** On August 9, 1939 were added to the 'cuarentena exterior' No. 3 of July 17, 1927, revised November 12, 1929, relative to the pink cotton bollworm [*Platyedra gossypiella*], certain counties of the State of Nuevo México recognized as being infested with 'gusano rosado'. (*Ibid.*).

Sweden. — Royal Decree No. 639 of June 28, 1940 regulates the use of hydrocyanic acid gas in the control of plant pests in greenhouses. (*Svensk författningssamling*, Stockholm den 29 juni 1940, nr 638-640, sid. 1265-1267).

*** Royal Decree No. 768 of August 19, 1940 modifies Royal Decree No. 50 of March 6, 1936 relative to the import of plants and parts of plants. (*Ibid.*, Stockholm den 21 augusti 1940, nr 768-780, sid. [1597]).

Switzerland. — The Decree of the Federal Council of July 6, 1940, relative to the import of fresh fruits, trees, shrubs, living plants and parts of plants, which came into force on July 15, 1940, supersedes the Decree of June 5, 1937 [see this *Bulletin*, 1937, No. 11, pp. 252-253].

To be noted among the changes made in the revised text that, in the case of certain fruits and according to their place of origin, the Division of Agriculture may order complete disinfection by means of methylic gas at the frontier station. In this instance, inspection will be limited to a summary examination of the goods and to the testing of some samples taken from the consignment. The Department of Public Economy will establish a reduced tariff for the inspection of goods subjected to compulsory disinfection. (*Recueil des Lois fédérales*, Berne, 10 juillet 1940, n° 31, p. 1225-1227).

RECENT BIBLIOGRAPHY

ALEXOPOULOS, Const. J. Some fungi from Greece. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 3, pp. 336-358, figs. 1-43. Bibliography on the mycoflora of Greece, pp. 357-358.

ARK, P. A., and THOMAS, H. Earl. Apple dieback in California. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 148-154, figs. 1-2. Literature cited, p. 154. [A non-parasitic disorder].

BACK, E. A. The cigarette beetle as a pest of cotton seed meal. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 739-749, figs. 1-7. Literature cited, p. 749. [*Lastoderma serricornis*].

BARBER, George W. Injury to sweet corn by *Euxesta stigmatias* Loew in southern Florida. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 789-880, figs. 1-2.

- BARNES, Dwight F., FISHER, Charles K., and KALOOSTIAN, George H. Flight habits of the raisin moth and other insects as indicated by the use of a rotary net. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 859-863, fig. 1. Literature cited, p. 863.
[*Ephestia figulilella*, *Cnemeplatia sericea*, *Carpophilus hemipterus*].
- BARR, C. G. Organic reserves in the roots of bindweed. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 6, pp. 391-413, figs. 1-10. Literature cited, pp. 412-413.
[*Convolvulus arvensis*. — Organic reserves in the roots of perennial weeds are closely associated with their persistence].
- BEAL, J. A. The Black Hills beetle, a serious enemy of Rocky Mountain pines. *U. S. Department of Agriculture. Farmers' Bulletin No. 1824*, Washington, D. C., 1939, 21 pp., 18 figs.
[*Dendroctonus ponderosae*].
- BEN-AMOTZ, Y. Experiments with oil spray for the control of the mussel scale (*Lepidosaphes pinnaeformis* Bché). *Hadar*, Tel-Aviv, Palestine, 1939, Vol. XII, No. 7, pp. 203-206, 1 graph. Bibliography, p. 206.
- BENNETT, C. W. Relation of food translocation to movement of virus of tobacco mosaic. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 6, pp. 361-390, figs. 1-9. Literature cited, pp. 389-390.
- BERNHARDT, Erich. Auftreten des Maikäfers in Schleswig-Holstein und seine Bekämpfung nach dem Sammelverfahren im Jahre 1938. *Landwirtschaftliche Jahrbücher*, Berlin 1939, 89. Bd., Heft 3, S. [460]-480, Abb. 1. Schrifttum, S. 480.
[*Melolontha*].
- BOBB, M. L., WOODSIDE, A. M., and JEFFERSON, R. N. Baits and bait traps in codling moth control. *Virginia Polytechnic Institute. Virginia Agricultural Experiment Station. Bulletin 320*, Blacksburg, Virginia, 1939, 19 pp., 6 figs. Literature cited, p. 19.
[*Carpocapsa* (*Cydia*) *pomonella*].
- BOCKMANN, Hans. Fruchtfolge und Halmbruchkrankheit bei Getreide. *Landwirtschaftliche Jahrbücher*, Berlin 1939, 89. Bd., Heft 3, S. [393]-412. Schrifttum, S. 412.
[*Cercospora herpotrichoides*].
- BOHART, R. M. A new host plant and locality record for the Christmas berry thrips. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 880-881, fig. 1. Literature cited, p. 881.
[*Rhynchothrips illex* on *Rhus ovata* on the hot and dry eastern slopes of Mount San Jacinto, Riverside County, California].
- BONDAR, Gregorio. A formiga saúva e sua extinção. *Instituto Central de Fomento Economico da Bahia. Boletim N. 1*, Bahia, 1938, 10 pags., 1 fig.
[*Atta sexdens*, *A. cephalotes*].
- BONDAR, Gregorio. Fatores adversos e molestias do cacau na Bahia. *Instituto de Cacau da Bahia S/A. Boletim Técnico N. 2. Série Pragas e Molestias*. Bahia, 1938, IV + 94 pags., 39 figs. Bibliografia, p. [91].
- BONDAR, Gregorio. Inséto daninhos e parasitas do cacau na Bahia. *Instituto de Cacau da Bahia. Boletim Técnico N. 5. Série Pragas e Molestias*. Bahia, 1939, [VI] + 112 pags., 57 figs. Bibliografia, pags. [107]-109.
- BONDY, Floyd F. Early versus late poisoning and a combination of both for boll weevil control. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 789-792. Literature cited, p. 792.
[*Anthonomus grandis*].
- BOTTGER, G. T. Preliminary studies of the nutritive requirements of the European corn borer. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 4, pp. 249-257. Literature cited, p. 257.
[*Pyrausta nubilalis*].
- BRATLEY, C. O. Development of scab on stored apples, 1938-1939. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 174-178, fig. 1.
[*Venturia inaequalis*].

- BRIERLEY, Philip, and DOSLITTLE, S. P. Some effects of strains of cucumber virus in lily and tulip. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 171-174, figs. 1-2. Literature cited, p. 174.
- BROWNE, F. G. The chengal seed-beetle, *Coccotrypes graniceps* Eich. (Coleoptera-Scolytidae). *The Malayan Forester*, Kuala Lumpur, 1939, Vol. VIII, No. 3, pp. 107-115, 1 pl. References, p. 115.
[This Scolytid infests the fruit of 'chengal' (*Balanocarpus heimii*)].
- BUCHANAN, I. L. The species of *Pantomorus* of America north of Mexico. *United States Department of Agriculture. Miscellaneous Publication No. 341*, Washington, D. C., 1939, 39 pp., 5 figs.
- CANDELORI, A. Lo stato attuale dei mezzi di difesa contro le gelate. *L'Ortofrutticoltura Italiana*, Roma, 1939, anno VIII, nn. 7-8, pp. 128-131, fig. 1.
- CARTWRIGHT, O. L. A survey of field infestation of insects attacking corn in the ear in South Carolina. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 780-782, figs. 1-6.
[*Heliothis obsoleta*, *Cathartus cassiae*, *Pyroderces rileyi*, *Sitotroga cerealella*, *Sitophilus oryzae*].
- CHARLES, Vera C. An entomogenous fungus on spider mites on water hyacinth. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 4, pp. 537-540. Literature cited, p. 540.
[*Rhinotrichum depauperatum* sp. nov. on *Paratetranychus yotheri* on leaves of *Piaropus crassipes*. A Latin diagnosis is given].
- CHAUVIN, R. Sur quelques différences pigmentaires entre les criquets pèlerins, grégaires et solitaires. *Comptes rendus des séances de la Société de Biologie et de ses filiales et associées*, Paris, 1939, tome CXXXII, n° 25, p. 397-398.
[*Schistocerca gregaria*].
- CHIAPPELLI, R. Il soffocamento delle piantine di riso provocato dall'*Heleocharis carniolica* Koch. *Risicoltura*, Vercelli, 1939, anno XXIX, n. 10, pp. 289-290, fig. 1.
- CHIU, Shin Foon. Toxicity studies of so-called "inert" materials with the rice weevil and the granary weevil. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 810-821, figs. 1-14. Literature cited, p. 821.
[*Sitophilus oryzae* and *S. granarius*].
- CIFERRI, Raffaele. Manuale di Patologia vegetale. Prefazione di L. Petri. Genova-Roma-Napoli-Città di Castello, Società Anonima Editrice Dante Alighieri (Albrighi, Segati e C.), 1941, XXIII + 730 pp., 256 figg. L. 50.
[Although this manual is intended chiefly as a didactic work, it will also be of use to specialists and in particular to those who wish to be informed of the studies on plant pathology carried out in Italy.
At the same time, the results of the recent and most important research work obtained in other countries are also given.
The volume is divided into seven parts. The first on general information comprises 122 pages. Other 99 pages cover non-parasitic diseases and disorders; 78, virus diseases. The next three parts deal with diseases caused by bacteria, myxomycetes and fungi respectively. Of the opinion that, from the didactic viewpoint, a thorough knowledge of a limited number of the basic diseases, which represent as far as possible the different types, is to be preferred, the author has avoided giving the long and often uninteresting lists of pathological phenomena and parasites usually included in books of this kind. In the concluding chapter, parasitic phanerogams are described.
An alphabetical index of the names of the Italian authors cited in the text and a detailed subject index are appended].
- COLLEGE OF AGRICULTURE, UNIVERSITY OF THE PHILIPPINES (Published by the). A handbook of Philippine agriculture. Issued in commemoration of the Thirtieth Anniversary. S. I., 1939, VIII + 803 pp.
[Contains, *inter alia*:—
Chapter III. Farm pests (pp. 201-232).
Chapter IV. Plant diseases (pp. 233-342)].

- COOLEY, J. S., and DAVIDSON, Ross W. A white root rot of apple trees caused by *Corticium galactinum*. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 139-148, figs. 1-4.
- CRALLEY, E. M. Effects of fertilizer on stem rot of rice. *University of Arkansas. College of Agriculture. Agricultural Experiment Station. Bulletin No. 383*, Fayetteville, Arkansas, 1939, 17 pp., 1 fig. Literature, p. 17. [*Leptosphaeria salvinii*].
- CREIGHTON, John T. Certain aspects of the white-fringed beetle problem. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 768-780, figs. 1-14. Literature cited, p. 780. [*Naupactus leucoloma*].
- CROSIER, Willard. Occurrence and longevity of *Ascochyta pisi* in seeds of hairy vetch. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 9, pp. 683-697, figs. 1-4. Literature cited, pp. 696-697. [On *Vicia villosa*].
- CUMLEY, R. W., and GOLDSMITH, G. W. Preliminary serological studies of *Phymatotrachium omnivorum*. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 130-139. Literature cited, p. 139.
- CUMMINS, George B. Uredinales of New Guinea. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 3, pp. 359-375, figs. 1-14.
- CUNNINGHAM, H. S., and WESSELS, P. H. Controlling common scab of the potato on Long Island by the addition of mercury compounds to the fertilizer mixture and the relation of soil reaction to the treatment. *New York State Agricultural Experiment Station. Bulletin No. 685*, Geneva, N. Y., 1939, 20 pp. Literature cited, pp. 19-20. [*Actinomyces scabies*].
- CUTRIGHT, C. R. Comstock's mealybug, *Pseudococcus comstocki* (Kuw.), on apple in Ohio. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, p. 888. Literature cited.
- DA COSTA LIMA, A. Insetos do Brasil. 1º tomo. Rio de Janeiro, 1939, X + 470 pags., 218 figs. Bibliografia, pags. 13-14, 25-36, 52-53, 67-69, 93-97, 106-108, 113-114, 117-119, 133-136, 150-151, 180-185, 188, 201-204, 212-213, 216, 246-250, 261-262, 322-327, 332-333, 348-349, 372-378, 399-404, 448-452. (Serie didatica, N.º 2, da Escola Nacional de Agronomia).
- DE BARROS RODRIGUEZ QUEIROZ, Jorge. A invasão de gafanhotos em Angola. Mé-moria apresentada á Conferência Internacional Anti-Acrídiana, realizada no Cairo em 1936. República Portuguesa. Colónia de Angola. *Boletim dos Serviços de Agricultura e Comércio, Colonização e Florestas*, Luanda, 1939, anos VIII e IX, núms. 32 a 39, págs. [29] a 56, 6 ests. [*Nomadacris septemfasciata*, *Locusta migratorioides*, *L. pardalina*].
- DE BIEZANKO, Ceslau Maria, e DE FREITAS, Ramão Gomes. Catalogo dos insetos encontrados em Pelotas e seus arredores. Fascículo II Homopteros. (Contribuição ao conhecimento da fisiografia do Rio Grande do Sul). *Escola de Agronomia "Eliseu Maciel"*. *Boletim N.º 26*, Pelotas-Rio Grande do Sul-Brasil, 1939, 20 pags.
- DE LOURDES DE OLIVEIRA, Maria. Recentes descobertas no campo dos virus. *Palestras Agronômicas*, Lisboa, 1939, vol. I (1938), págs. 7-15. Referências bibliográficas, págs. 14-15.
- DE SORNAY, P. Le martin. *La Revue agricole de l'île Maurice*, Maurice, 1939, n.º 104, p. 52-57. [*Acridotheres tristis*].
- DICKE, F. F. Seasonal abundance of the corn earworm. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 4, pp. 237-257, figs. 1-5. Literature cited, p. 257. [*Heliothis armigera*].
- DI STEFANO, Gaetano. Contributo alla conoscenza dell'*Orgyia antiqua* L. (Lepid. *Lymantriidae*). "*Redia*", Firenze, 1939, vol. XXV, pp. [303]-318, figg. I-VII, tav. I-II.

- DONÀ, A. Le virosi della patata e gli afidi. *Giornale di Agricoltura della Domenica*, Roma, 1939, anno XLIX, n. 41, p. 349, 1 fig.
- DOWNES, W. Derris for ants and wasps. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 883-884.
- DRUMMOND-GONÇALVES, R[aul]. A "entomosporiose" e o desaparecimento da coltura do marneleiro. *O Biológico*, São Paulo, 1939, ano V, n.º 8, pages. [153]-157, est. VI.
[*Entomosporium maculatum*].
- DULZETTO, Filippo, [e] MUSCATELLO, Giuseppe. Sulla «fetola» delle arance e sulle probabili cause che la determinano. *L'Italia Agricola*, Roma, 1939, anno 76, n. 9, pp. [685]-693, figg. 1-8.
[The authors advance the hypothesis that this disorder is caused by punctures from *Empoasca*, although other insects are not excluded].
- EDDINS, A. H. Potato seed-piece rot caused by *Fusarium oxysporum*. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 181-183, figs. 1-2.
- ELLISOR, L. O., and FLOYD, E. H. Further investigations on the control of the velvetbean caterpillar, *Anticarsia gemmatilis* (Hbn.). *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 863-867.
- ERLER, E. Beobachtungen zur Ökologie und Bekämpfung des Eichenwicklers (*Tortrix viridana* L.) in Westfalen. *Anzeiger für Schädlingskunde*, Berlin 1939, XV. Jahrg., Heft 9, S. 105-108, Abb. 9. Literaturverzeichnis, S. 108.
- ESSIG, E. O. The golden codling moth, *Carpocapsa pomonella* (L.) var. *simpsonii* Busck. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 885-886. Literature cited, p. 886.
- FAES, H[enri]. Des phénomènes qui expliquent les brûlures causées aux végétaux par l'application des bouillies cupriques. *La Terre Vaudoise*, Lausanne, 1939, XXXI^e année, n.º 40, p. 532-533.
- FIKRY, Amin. Nematode disease of stone-fruits. *Ministry of Agriculture, Egypt. Technical and Scientific Service (Mycological Section). Bulletin No. 217*, Cairo, 1939, 9 pp., 21 pls. Literature cited, p. 9.
[*Heterodera marioni*].
- FISCHER, George W. Fundamental studies of the stripe smut of grasses (*Ustilago striaeformis*) in the Pacific Northwest. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 93-118, figs. 1-4. Literature cited, pp. 117-118.
- FISCHER, George W. Two cases of haplo-lethal deficiency in *Ustilago bullata* operative against saprophytism. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 3, pp. 275-289, figs. 1-4. Literature cited, p. 289.
- FLANDERS, S. E. The propagation and introduction of *Coccophagus heteropneusticus* Comp., a parasite of Lecaniine scale insects. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 888-890. Literature cited, p. 890.
- FRAMPTON, Vernon L. On the molecular weight of the tobacco mosaic virus protein. *Science*, Lancaster, Pa., 1939, New Series, Vol. 90, No. 2335, pp. 305-306, figs. 1-2.
- FRANZ, Host. Massenvermehrung und Phasenwechsel bei Wanderheuschrecken. Sammelbericht über neueres Schrifttum. *Der Tropenpflanzer*, Berlin 1940, 43. Jahrg., Nr. 8, S. [249]-262. Schrifttum, S. 260-262.
- GAINES, J. C. Insecticide tests for bollworm control during 1938. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 821-824. Literature cited, p. 824.
[*Heliothis obsoleta*].
- GAINES, R. C. Boll weevil control tests with calcium arsenates containing different percentages of water-soluble arsenic pentoxide. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 794-797. Literature cited, p. 797.
[*Anthonomus grandis*].
- GARTHWAITE, P. F. On the biology of *Calopepla leayana* Latr. (Chrysomelidae, Col.) and the possibilities of control. *Indian Forest Records (New Series). Entomology*, Delhi, 1939, Vol. V, No. 2, pp. I-V + 237-277, pls. I-II. References to literature, p. 275.
[A beetle which feeds on the leaves of *Gmelina arborea*].

- GEORGESCU, Const. C., și BADEA, M. Uscarea pueților de *Quercus rubra*. *Revista Pădurilor*, București, 1939, an. 51, nr. 9, pag. [717]-719, fig. 1-2.
[In Rumanian, with titles also in German and French and summary in French: — 'Absterben junger Pflanzen von Roteiche'. — 'Le dépérissement des plants de *Quercus rubra*'. — *Phoma allantella* and a bacterium of which the name is not indicated].
- GEORGI, C. D. V., and TEIK, Gunn Lay. Preliminary results of analysis of clonal types of Derris under field conditions. *The Malayan Agricultural Journal*, Kuala Lumpur, 1939, Vol. XXVII, No. 8, pp. 302-332. References, p. 329.
[*Derris malaccensis* var. *sarawakensis*, *D. elliptica*].
- GILMER, Paul M. Control of the boll weevil on Sea-Island cotton. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 802-805. Literature cited, p. 805.
[*Anthonomus grandis*].
- GINSBURG, Joseph M. Chemical effect on lead arsenate of certain salts which may be present in soil and spray waters. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 3, pp. 199-205. Literature cited, p. 205.
- GOIDÀNICH, Athos. Contributi alla conoscenza dell'entomofauna di risaia. II. Gli Idrocampini: i Lepidotteri più dannosi al riso in Italia. *Risicoltura*, Vercelli, 1939, anno XXIX, n. 9, pp. 253-265, figg. 1-3.
[*Nymphula nymphacata*, *N. stagnata*].
- GOIDÀNICH, Athos. Per la battaglia autarchica. Cura del grano immagazzinato. *Giornale di Agricoltura della Domenica*, Roma, 1939, anno XLIX, n. 37, p. [317].
[On the protection of wheat against pests, particularly those found in small storehouses in the country and in wheat merely stacked in heaps.].
- GOIDÀNICH, Athos. Un insetticida dell'avvenire, il rotenone. *Giornale di Agricoltura della Domenica*, Roma, 1939, anno XLIX, n. 41, p. 349.
- GOIDÀNICH, Gabriele. La lotta contro la cuscuta dei medicali e dei trifogliai mediante l'arsenito sodico. *Giornale di Agricoltura della Domenica*, Roma, 1939, anno XLIX, n. 37, p. 320.
- GÓMEZ-MENOR, Juan. Cócidos de España. Segunda tirada. Madrid, Tipografía Artística, 1940, XI-432 págs., 136 figs. (Ministerio de Agricultura. Instituto Nacional de Investigaciones Agronómicas. Estación de Fitopatología Agrícola).
[In this memoir, a list is given of the scale insects found up-to-date in Spain. The morphological description of the different species is supplemented, whenever possible, by information on their host plants, their geographic distribution, natural enemies, etc.
The original text has been revised and enriched by necessary rectifications, annotations, also bibliographical, and illustrations by José del Cañizo Gómez, to whom the accurate preparation of this edition is due].
- GÓMEZ MENOR, Juan. Enfermedades del plátano, del guineo y del rulo. Instrucciones para reconocer la pudrición bacteriana, desecación fungosa, Panamá, en las plantas del género *Musa* (plátanos, guineos, etc.). *Revista de Agricultura*, San Cristóbal, Prov. Trujillo, República Dominicana, 1939, vol. XXX, no. 118, págs. 340 a 342, 1 lám.
[*Bacterium musae*, *Helminthosporium torulosum*, *Cordana musae*, *Fusarium cubense*, *Tylenchus musicola*].
- GOODHUE, L. D., and HALLER, H. L. Analysis of the water extract of derris and cubé. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 877-879. Literature cited, p. 879.
- Goss, Robert W. A dry rot of potato stems caused by *Fusarium solani*. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 160-165, fig. 1.
- GUBA, E. F. Control of tomato leaf mold in greenhouses. *Massachusetts Agricultural Experiment Station. Bulletin* No. 361, Amherst, Mass., 1939, 36 pp., 7 figs. Literature cited, pp. 33-36.
[*Cladosporium fulvum*].
- HAMILTON, D. W., and STEINER, L. F. Light traps and codling moth control. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 867-872, figs. 1-2. Literature cited, p. 872.
[*Carpocapsa* (*Cydia*) *pomonella*].

- HAMPE, P. Propriétés physiques des produits insecticides. *Revue horticole suisse*, Châtelaine-Genève, 1939, XII^e année, n° 9, p. 199-202, fig. 1-2.
- HANSEN, H. N., and THOMAS, H. Earl. Flower blight of camellias. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 166-170, figs. 1-2.
[*Sclerotinia camelliae* n. sp. on *Camellia japonica*. With a Latin diagnosis].
- HARRINGTON, Cecil D., and SEARLS, Ed. M. Influence of the physiological age of the pea plant on its recovery from aphid damage. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 3, pp. 157-161, figs. 1-2.
[*Illinoia pisi*].
- HASTINGS, Ellsworth B., and PEPPER, J. H. Studies on some of the factors involved in the use of sodium arsenite against the Mormon cricket (*Anabrus simplex* Hald.). *Montana State College. Agricultural Experiment Station. Bulletin 370*, Bozeman, Montana, 1939, 26 pp., 6 figs. Literature cited, p. 25.
- HEMMI, T[akewo]. Occurrence of the apple tree canker caused by *Botryosphaeria Ribis* in Japan. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 3, pp. 184-190, 5 figs. [Bibliography], p. 190.
[In Japanese, with title also in English].
- HEMMI, Takewo, and IMURA, Junzo. On the relation of air-humidity to conidial formation in the rice blast fungus, *Piricularia Oryzae*, and the characteristics in the germination of conidia produced by the strains showing different pathogenicity. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 3, pp. 147-156. [Bibliography], p. 155.
[In Japanese, with title also in English].
- HEMMI, Takewo, and KONISHI, Sentaro. Studies on the *Phytophthora* rot of eggplant on the market. *Annals of the Phytopathological Society of Japan*, Tōkyō, 1939, Vol. IX, No. 3, pp. 157-169. [Bibliography], pp. 167-168.
[In Japanese, with title also in English. — *Phytophthora melongenae*].
- HOFFMANN, Clarence H. Observations on the biology of *Saperda tridentata* Oliv. and *Magdalis armicollis* Say (Coleoptera). *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 848-851. Literature cited, p. 851.
- HOOD, Clifford E. Spray experiments for the control of the elm leaf beetle. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 833-838, figs. 1-3.
[*Galerucella xanthomelaena*].
- ISELY, Dwight. Timing seasonal occurrence and abundance of the codling moth. *University of Arkansas. College of Agriculture. Agricultural Experiment Station. Bulletin*, No. 382, Fayetteville, Arkansas, 1939, 26 pp., 6 figs. Literature, p. 26.
[*Carpocapsa* (*Cydia*) *pomonella*].
- JACKSON, L. W. R. Lightning injury of black locust seedlings. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 183-184, fig. 1.
[*Robinia pseud-acacia*].
- JENKINS, Anna E., and RAY, W. Winfield. A new host for *Taphrina dearnessii* and geographic distribution of *Taphrina* on North American maples. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 3, pp. 408-414, figs. 1-4. Literature cited, p. 414.
[*Taphrina dearnessii* on *Acer spicatum*].
- JENKINS, Wilbert A. A new virus disease of snap beans. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 4, pp. 279-283, figs. 1-3. Literature cited, p. 288.
- JONES, T. H. Elm bark beetles. *U. S. Department of Agriculture. Leaflet No. 185*, Washington, D. C., 1939, 8 pp., 7 figs.
[*Scolytus multistriatus*, *Hylurgopinus rufipes*].
- KALSHOVEN, L. G. E. Een boktorlarf als boorder in levende en doode djatiboomen. (Monohammus rusticator Fab., Fam. Lamiidae). *Tectona*, Buitenzorg 1939, dl. XXXII, afl. 4/5, blz. 321-337, 1 fig., pl. I-III. Literatuur, blz. 335-336.
[In Dutch, with title and summary also in English:— 'A longicorn borer in living and dead teak trees: Monohammus rusticator Fab., fam. Lamiidae'].

- KASSAB, A. The control of mole-cricket with barium fluosilicate. *Ministry of Agriculture, Egypt. Technical and Scientific Service. Entomological Section. Bulletin No. 193*, Cairo, 1939, 13 pp., 9 figs. Literature cited, pp. 12-13. [*Gryllotalpa*].
- KIENHOLZ, J. R. Comparative study of the apple anthracnose and perennial canker fungi. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 9, pp. 635-665, figs. 1-10. Literature cited, pp. 663-665. [*Neofabraea malicorticis* and *Gloeosporium perennans*].
- KLAUS, Horst. Das Problem der Bodenmüdigkeit unter Berücksichtigung des Obstbaues. *Landwirtschaftliche Jahrbücher*, Berlin 1939, 89. Bd., Heft 3, S. [413]-459, Abb. 1-8. Schrifttum, S. 456-459.
- LAMB, C. A. Further studies on root characteristics of winter wheat in relation to winter injury. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 9, pp. 667-681, fig. 1.
- LAMERSON, Paul G., and PARKER, Ralph L. Control of the American strawberry leaf roller, *Ancylis fragariae*, in the Lower Missouri River Valley. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 824-828.
- LAMERSON, Paul G., and PARKER, Ralph L. Lead arsenate combinations and nicotine combinations as control measures for the codling moth, 1938. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 828-832. Literature cited, p. 832. [*Cydia pomonella*].
- LANCHESTER, H. P. The external anatomy of the larva of the Pacific coast wireworm. *United States Department of Agriculture. Technical Bulletin No. 693*, Washington, D. C., 1939, 40 pp., 7 figs. Literature cited, pp. 39-40. [*Limoniis (Pheletes) canus*].
- LANGENBUCH, R. Ersatz des Bruchreises durch einheimische Köderstoffe bei der Werrenbekämpfung. *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1939, 19. Jahrg., Nr. 9, S. 86-87. [*Gryllotalpa gryllotalpa*].
- LEVER, R. J. A. W. Entomological notes. *Agricultural Journal*, Suva, 1939, Vol. 10, No. 4, pp. 125-126.
[Contains:—
1. A sandfly attacking a caterpillar. [*Forcipomyia hirtipes* on *Doleschallia bisaltide*].
2. The lantana bug (*Teleonemia*).
3. Copra mite (*Caloglyphus*)].
- LINCOLN, Ralph E. Bacterial wilt resistance and genetic host-parasite interactions in maize. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 4, pp. 217-239, figs. 1-5. Literature cited, pp. 238-239. [*Phylomonas stewartii*].
- LOUNSKY, J. Le bromure de méthyle. Une date de l'évolution des possibilités de la désinsectisation par fumigation. *Annales de Gembloux*, Boitsfort, 1939, 45^e année, 12^e livr., p. [469]-491. Littérature citée, p. 489-491.
- LUTTRELL, E. S. An undescribed fungus on Japanese cherry. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 4, pp. 530-536, figs. 1-9. [*Catenophora pruni* gen. nov. et sp. nov. on *Prunus serrulata*. Latin diagnoses are given].
- MALENOTTI, Ettore. Dove andiamo con certi studi sulla Piralide? *Giornale di Agricoltura della Domenica*, Roma, 1939, anno XLIX, n. 42, p. 356. [*Pyrausta nubilalis*].
- MAMMEN, G. Kein Saatgut darf ungebeizt in den Boden! *Mitteilungen für die Landwirtschaft*, Berlin 1939, 54. Jahrg., Heft 38, S. 843-844.
- MARSHALL, James. The hydrogen ion concentration of the digestive fluids and blood of the codling moth larva. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 838-843, fig. 1. Literature cited, p. 843. [*Carpocapsa (Cydia) pomonella*].

- MATSUMOTO, Takashi. Phage-produced resistant strains of *Bacillus aroideae*. I. Resistant strain appeared in culture solutions. *Transactions of the Natural History Society of Formosa, Taihoku, Formosa, Japan*, 1939, Vol. XXIX, No. 195, pp. 317-338.
- MATSUMOTO, Takashi. Phage-produced resistant strains of *Bacillus aroideae*. II. The behaviour of the organisms in phage-inoculated and cultures. *Transactions of the Natural History Society of Formosa, Taihoku, Formosa, Japan*, 1940, Vol. XXX, Nos. 200-201, pp. [89]-98.
- McKINNEY, K. B. Common insects attacking sugar beets and vegetable crops in the Salt River Valley of Arizona. *Journal of Economic Entomology, Menasha, Wisconsin*, 1939, Vol. 32, No. 6, pp. 808-810.
- MCGARR, R. L. Progress report on mixtures of calcium arsenate and sulfur for control of the boll weevil at State College, Miss. *Journal of Economic Entomology, Menasha, Wisconsin*, 1939, Vol. 32, No. 6, pp. 792-794. [*Anthonomus grandis*].
- McPHAIL, M. Protein lures for fruitflies. *Journal of Economic Entomology, Menasha, Wisconsin*, 1939, Vol. 32, No. 6, pp. 758-761. [*Anastrepha ludens*, *A. striata*].
- MELIS, Antonio. Tisanotteri italiani. *Genus Haplothrips*. "Redia", Firenze, 1939, vol. XXV, pp. [37]-86, figg. I-XIX. [*H. hispanicus*, *H. distinguendus*, *H. simplex*, *H. floricola*, *H. tritici*, *H. aculeatus*, *H. cypriotes*].
- MILLER, Erston V., WINSTON, J. R., and FISHER, D. F. Production of epinasty by emanations from normal and decaying citrus fruits and from *Penicillium digitatum*. *Journal of Agricultural Research, Washington, D. C.*, 1940, Vol. 60, No. 4, pp. 269-277, figs. 1-4. Literature cited, p. 277.
- MILLER, Erston V., and SCHOMER, Harold A. A physiological study of soft scald in Jonathan apples. *Journal of Agricultural Research, Washington, D. C.*, 1940, Vol. 60, No. 3, pp. 183-192, fig. 1. Literature cited, pp. 191-192. [Soft scald has been attributed to a deficiency of oxygen in the surrounding air].
- MILLS, H. B., and PEPPER, J. H. The effect on humans of the ingestion of the confused flour beetle. *Journal of Economic Entomology, Menasha, Wisconsin*, 1939, Vol. 32, No. 6, pp. 874-875. [*Tribolium confusum*].
- MORGAN, A. C., and CHAMBERLIN, F. S. The tobacco budworm and its control in the Georgia and Florida tobacco-growing region. *U. S. Department of Agriculture. Farmers' Bulletin No. 1531*, Washington, D. C., 1939, 9 pp., 10 figs. [*Heliothis virescens*].
- MÜLLER, Fritz P. Nachwirkungen des Berührungstäubemittels "Lipan" auf die bei der Begiftung überlebenden Kieferspanner. *Forstwissenschaftliches Centralblatt, Berlin* 1939, 61. Jahrg., Heft 17, S. 538-544. Schriftenverzeichnis, S. 544. [*Bupalus piniarius*].
- MÜNCH, E. Die Ursachen des "Korbwuchses" der Jungläärchen. *Forstwissenschaftliches Centralblatt, Berlin* 1939, 61. Jahrg., Heft 17, S. [525]-531, Abb. 1-4. [A malformation caused by cold].
- MUNDKUR, B. B. Taxonomy of the sugar-cane smuts. *Royal Botanic Gardens, Kew. Bulletin of Miscellaneous Information, London*, 1939, No. 10, pp. 525-533. References, pp. 532-533. [*Ustilago scitaminea*, *U. scitaminea* var. *sacchari-barberi* var. nov., *U. scitaminea* var. *sacchari-officinarum* var. nov.].
- PARKIN, E. A., and PHILLIPS, E. W. J. The depletion of starch from timber in relation to attack by *Lyctus* beetles. IV. A third experiment on the girdling of standing oak trees. *Forestry, London*, 1939, Vol. XIII, No. 2, pp. [134]-145. Literature references, p. 145.
- PASSALACQUA, Tito. Due nuove matrici del *Bacterium tumefaciens*. *Lavori del Regio Istituto Botanico di Palermo, Palermo*, 1939, vol. X, pp. [42]-46, 3 figg. Bibliografia, p. 46. [*Ficus bennettii* and *F. bellengeri*].

- PICKEL, B. A influencia da calda bordalêsa sobre a folhagem das plantas. *O Biológico*, São Paulo, 1939, ano V, n° 8, pags. 167-171.
- PONTIS, Rafael E. Enfermedades poco comunes de las papas. *Agricultura Austral*, Osorno-Chile, 1939, año VI, n° 77, págs. 2006 a 2008, 1 fig. ['Corazón negro', 'corazón hueco' (physiological diseases), 'verrugosis' (*Heterodera marioni*), 'hendiduras', 'tuberculos secundarios' (causes unknown)].
- POOS, F. W. Host plants harboring *Aplanobacter stewarti* without showing external symptoms after inoculation by *Chaetocnema pulicaria*. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 881-882.
- RANGASWAMI, Rao Sahib S., and GRIFFITH, A. I. A note on the control and eradication of new outbreaks of the spike disease of sandal (*Santalum album*). *Indian Forest Records (New Series)*. *Silviculture*, Delhi, 1939, Vol. III, No. 7, pp. i-iv, 263-290, 4 figs., pls. 1-6. References, p. 290. [A virus disease].
- RAWLINS, T. E., and TOMPKINS, C. M. Carborundum for plant-virus inoculations. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 185-186.
- RAWLINS, W. A. Planting dates as affecting wireworm injury to potato tubers. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 761-765, figs. 1-2. Literature cited, p. 765. [*Agriotes mancus*, *Limonius ectypus*, *Melanotus* sp.].
- REA, H. E. The control of cotton root rot in the Blackland region of Texas. *Texas Agricultural Experiment Station. Bulletin No. 573*, College Station, Brazos Country, Texas, 1939, 36 pp. Literature cited, pp. 34-36. [*Phymatotrichum omnivorum*].
- REMSBERG, Ruth E. The snow molds of grains and grasses caused by *Typhula itoana* and *Typhula idahoensis*. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 178-180. Literature cited, p. 180.
- RIVNAY, E. Studies in the biology and control of *Pseudococcus comstocki* Kuwana, on citrus in Palestine. *Hadar*, Tel-Aviv, Palestine, 1939, Vol. XII, No. 7, pp. 197-201, figs. 1-3. Literature, p. 201.
- ROSE, Dean H., BRATLEY, C. O., and PENTZER, W. T. Market diseases of fruits and vegetables: grapes and other small fruits. *United States Department of Agriculture. Miscellaneous Publication No. 340*, Washington, D. C., 1939, 27 pp., 10 pls. Literature cited, pp. 24-26. [*Sphaerotheca mors-uvae*, *Gloeosporium ampelophagum*, *Aspergillus niger*, *Guignardia bidwellii*, *Penicillium* sp., *Plasmopara viticola*, *Botrytis* spp., *Cladosporium* sp., *Alternaria* sp., *Hormodendrum* sp., *Uncinula necator*, *Phytophthora cactorum*, *Rhizoctonia* spp., *Rhizopus niger*, *Sclerotinia* sp., *Pezizella lythri*, etc.].
- SAKIMURA, K. *Thrips nigropilosus* Uzel, a non-vector of the yellow spot virus. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, p. 883. Literature cited.
- SANFORD, G. B. Research on certain soil-borne diseases as affected by other micro-organisms. *Scientific Agriculture*, Ottawa, Canada, 1939, Vol. XIX, No. 10, pp. 609-615. References, pp. 614-615. [The object of this paper is to discuss briefly, from the viewpoint of the plant pathologist, some of the problems on soil-borne diseases as affected by antibiosis and related phenomena].
- SCHAFFNER, Jr., J. V. *Neodiprion sertifer* (Geoff.), a pine sawfly accidentally introduced into New Jersey from Europe. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 887-888. Literature cited, p. 888.
- SCHOONOVER, W. R., BROOKS, F. A., and WALKER, H. B. Protection of orchards against frost. *The California Citrograph*, Los Angeles, 1939, Vol. 24, No. 12, pp. 428, 457, 459.
- SEEVER, F. J., and WATERSTON, J. M. Contributions to the mycoflora of Bermuda - I. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 3, pp. 388-407, figg. 1-6.

- SHEAR, G. M., and USSERY, H. D. Frenching of tobacco distinguished from thallium toxicity by spectrographic analysis. *Journal of Agricultural Research*, Washington D. C., 1940, Vol. 60, No. 2, pp. 129-139, pl. 1. Literature cited, p. 139. [It was postulated that frenching is probably a symptom of thallium toxicity].
- SHEPARD, Harold H. Insects infesting stored grain and seeds. *University of Minnesota. Agricultural Experiment Station. Bulletin 340*, 1939, 30 pp., 10 figs. Literature, pp. 28-30.
[*Sitophilus granarius*, *S. oryzae*, *Rhizopertha dominica*, *Sitotroga cerealella*, *Acanthoscelides obtectus*, *Bruchus pisorum*, *Oryzaephilus surinamensis*, *Plodia interpunctella*, *Tenebroides mauritanicus*, *Trogoderma ornata*, *Troctes divinatorius*, *Tyroglyphus farinae*, etc.].
- SHEPARD, Harold H., and BUZICKY, Albert W. Further studies of methyl bromide as an insect fumigant. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 854-859, figs. 1-2. Literature cited, p. 859.
- SIEGLER, E. H., MUNGER, F., and SMITH, L. E. Toxicity of certain organic insecticides to codling moth larvae in laboratory tests. *United States Department of Agriculture. Circular No. 523*, Washington, D. C., 1939, 9 pp.
[*Carpocapsa* (*Cydia*) *pomonella*].
- SMIETON, Margaret J. On the use of chlorinated nitrobenzenes for the control of club root rot of Brassicae. *The Journal of Pomology and Horticultural Science*, London, 1939, Vol. XVII, No. 3, pp. 195-217. References, p. 217.
[*Plasmodiophora brassicae*].
- SMITH, G. L., SCALES, A. L., and GAINES, R. C. Additional records on the effectiveness of several insecticides against three cotton pests. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 798-802. Literature cited, p. 802.
[*Anthonomus grandis*, *Alabama argillacea*, *Lygus pratensis*].
- SMITH, Roger C. Insect collections and rearings on castor bean plants, with especial reference to grasshoppers. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 749-758, figs. 1-10. Literature cited pp. 757-758. [Castor beans (*Ricinus communis*) cannot be used as a trap crop because they are not more attractive to grasshoppers and other common pests than the usual crop food plant].
- SOUTY, J. Le court-noué de la vigne. *Bulletin international du Vin*, Paris, 1939, 12^e année, n° 136, p. [99]-100.
[A virus disease].
- SPEYER, W. Die gelbe Stachelbeerblattwespe *Pteronus* (*Pteronidea*) *ribesii* Scop. *Biologische Reichsanstalt für Land- und Forstwirtschaft. Flugblatt Nr. 164*, Berlin-Dahlem 1939, 6 S., 6 Abb.
- SPEYER, W. Aufzucht und Entwicklung des Baumweisslings (*Aporia crataegi* L.). *Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1939, 19. Jahrg., Nr. 9, S. [85]-86.
- STAHELIN, M. Critique du calendrier d'incubation du mildiou de la vigne (*Plasmopara viticola*). *La Terre Vaudoise*, Lausanne, 1939, XXXI^e année, n° 36, p. 483-484.
- STAHEL, Gerold. *Corticium areolatum*, the cause of the areolate leaf spot of citrus. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 119-130, figs. 1-7. Literature cited, p. 130.
[A Latin diagnosis and an English description of *Corticium areolatum* n. sp. are given].
- STAPP, C., and PFEIL, E. Der Pflanzenkrebs und sein Erreger *Pseudomonas tumefaciens*. VIII. Mitteilung. Zur Biologie der Krebsgewebes. *Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, II. Abt., Jena 1939, 101. Bd., Nr. 14/17. S. 261-286, Abb. 1. Literatur, S. 284-286.
- STATENS VÄXTSKYDDSANSTALT. Knäppare. *Flygblad Nr. 45*, Stockholm 1939, 4 sid., 4 fig.
[*Agriotes lineatus*, *A. obscurus*, *Corymbites* (*Selatosomus*) *aeneus*].

- STATENS VÄXTSKYDDSANSTALT. Koloradoskalbaggen. *Flyblad N:r 46*, Stockholm 1939, 8 sid., 3 fig.
[*Leptinotarsa decemlineata*].
- STELLWAAG, F. Untersuchungen über den Ersatz arsenhaltiger Bekämpfungsmittel im Weinbau. Teil VII. Ölemulsionen zur Abtötung der Winterpuppen des bekreuzten Traubenwicklers. *Anzeiger für Schädlingskunde*, Berlin 1939, XV. Jahrg., Heft 9, S. [97]-105, Abb. 1-2. Schriftenverzeichnis, S. 105.
[*Polychrosis botrana*].
- ST. JOHN, J. L., McCULLOCH, E. C., SOTOLA, J., and TODHUNTER, E. N. Toxicity to sheep of lead arsenate and lead arsenate spray residues. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 5, pp. 317-329. Literature cited, pp. 328-329.
- SWINGLE, M. C. The effect of previous diet on the toxic action of lead arsenate to a leaf-feeding insect. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, p. 884.
[*Prodenia eridania*].
- TAKAHASHI, William N. An attempt to propagate tobacco-mosaic virus 1 in the chorio-allantoic membrane of the developing chick embryo. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 184-185.
- THOMAS, C. A., and HORSEFALL, J. L. A method for studying the fauna of mushroom manure. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, p. 885.
- THOMAS, H. Earl, and ARK, P. A. Some factors affecting the susceptibility of plants to fire blight. *Hilgardia*, Berkeley, California, 1939, Vol. 12, No. 4, pp. 301-322, figs. 1-2. Literature cited, pp. 320-322.
[*Bacillus amylovorus*].
- THOMAS, K. M., and KRISHNASWAMI, C. S. Little leaf - a transmissible disease of brinjal. *Proceedings of the Indian Academy of Sciences, Section B*, Bangalore, 1939, Vol. X, No. 2, pp. 201-212, pls. V-VI. References, p. 211.
[A virus disease of *Solanum melongena*].
- THOMPSON, H. S. *Orobanche hederæ* in and about Bristol. *The Journal of Botany*, London, 1939, Vol. LXXVII, No. 920, pp. 248-249.
- THOMPSON, W. L. Cultural practices and their influence upon citrus pests. *Journal of Economic Entomology*, Menasha, Wisconsin, 1939, Vol. 32, No. 6, pp. 782-789. Literature cited, p. 789.
- THURSTON, Jr., H. W. The rusts of Minas Geraes, Brazil based on collections by A. S. Müller. *Mycologia*, Lancaster, Pa., 1940, Vol. XXXII, No. 3, pp. 290-309.
- TROTTER, A[lessandro]. Può essere limitata la diffusione delle malattie e dei parassiti del tabacco? R. Osservatorio regionale di Fitopatologia di Portici (Napoli): Sezione di Patologia vegetale (Laboratorio di studio e sperimentazione) presso la Facoltà di Agraria della R. Università di Napoli. *Ricerche, osservazioni e divulgazioni fitopatologiche, per la Campania ed il Mezzogiorno*. Portici, 1940, [n.] VIII, pp. [65]-70.
[For the French and German text of this article, see this *Bulletin*, 1940, No. 1, p. 21].
- TROTTER, A[lessandro]. La lotta contro i parassiti crittogamici nel quadro economico dell'autarchia nazionale. R. Osservatorio regionale di Fitopatologia di Portici (Napoli): Sezione di Patologia vegetale (Laboratorio di studio e sperimentazione) presso la Facoltà di Agraria della R. Università di Napoli. *Osservazioni, ricerche e divulgazioni fitopatologiche, per la Campania ed il Mezzogiorno*. Portici, 1940, [n.] VIII, pp. [71]-76.
- TROTTER, A[lessandro]. Lotta obbligatoria contro le Orobanche del tabacco in Comune di Cava dei Tirreni. R. Osservatorio regionale di Fitopatologia di Portici (Napoli): Sezione di Patologia vegetale (Laboratorio di studio e sperimentazione) presso la Facoltà di Agraria della R. Università di Napoli. *Ricerche, osservazioni e divulgazioni fitopatologiche, per la Campania ed il Mezzogiorno*. Portici, 1940, [n.] VIII, pp. [77]-79.
[*Orobanche* spp.].

- TROTTER, A[lessandro], e CRISTINZIO, M. Prove di allevamento e di selezione della patata a mezzo di semi. R. Osservatorio regionale di Fitopatologia di Portici (Napoli): Sezione di Patologia vegetale (Laboratorio di studio e sperimentazione) presso la Facoltà di Agraria della R. Università di Napoli. *Ricerche, osservazioni e divulgazioni fitopatologiche, per la Campania ed il Mezzogiorno*. Portici, 1940, [n.] VIII, pp. [1]-64, figg. 1-8, 3 graf., tav. I-XXIV. Altre pubblicazioni citate [oltre quelle già ricordate a piè di pagina], pp. 63-64. [Experiments on the sexual multiplication of potatoes, with a view to obtaining, besides higher yields, new improved varieties, not subject to degeneration].
- VASILIU, V. V., și REIFF, Francisc. Atac de lecanine in plantațiile de salcâm. *Revista Pădurilor*, București, 1939, an. 51, nr. 9, pag. [723]-724. [In Rumanian, with title also in German and French, and summary in French: — 'Befall von Lecanium in Robinienpflanzungen.' — 'Plantations de robinier attaquées par Lecanium corni robiniarum'].]
- VIRGIN, Walter J., and WALKER, J. C. Relation of temperature and moisture to near-wilt of pea. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 8, pp. 591-600, figs. 1-2. [*Fusarium oxysporum* f. 8].
- VIRGIN, W[alter] J., and WALKER, J. C. Relation of the near-wilt fungus to the pea plant. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 4, pp. 241-248, figs. 1-3, pl. 1. Literature cited, p. 248. [*Fusarium oxysporum* f. 8].
- WALKER, J. C., and LARSON, R. H. Yellow dwarf of potato in Wisconsin. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 4, pp. 259-280, figs. 1-6. Literature cited, pp. 279-280.
- WALKER, J. C., and MUSBACH, F. I. Effect of moisture, fertility, and fertilizer placement on root rot of canning pear in Wisconsin. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 8, pp. 579-590, figs. 1-5. Literature cited, p. 590. [*Aphanomyces euteiches*].
- WARTENBERG, Hans. Bemerkungen über Kälteschäden an ruhenden und keimenden Samen. *Allgemeine Forst- und Jagd-Zeitung*, Frankfurt am Main 1940, 116. Jahrg., S. 23-25.
- WATERSTON, J. M. Precautionary measures against the Japanese beetle. *Department of Agriculture, Bermuda. Agricultural Bulletin*, 1939, Vol. XVIII, Nos. 3 and 4, pp. 21-22. [*Popillia japonica*].
- WEIMER, J. L. Methods of value in breeding Austrian winter field peas for disease resistance in the South. *Phytopathology*, Lancaster, Pa., 1940, Vol. 30, No. 2, pp. 155-160, figs. 1-3. [*Ascochyta pinodella*, *Mycosphaerella pinodes*].
- WELLBORN, Vera. Enfermedades del mosaico. Estado actual de las investigaciones con respecto a las enfermedades producidas por virus. *El Café de El Salvador*, San Salvador, 1939, vol. X, núm. 107, págs. 721 a 740, 5 figs.
- WHITE, C. T. Hoary cress (*Lepidium draba*), a possible serious weed pest in Queensland. *Queensland Agricultural Journal*, Brisbane, 1939, Vol. LII, Pt. 6, pp. 658-661, pls. 275-277.
- WIANT, James S., and TUCKER, C. M. A rot of Winter Queen watermelons caused by *Phytophthora capsici*. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 2, pp. 73-88, figs. 1-6. Literature cited, p. 88.
- WILCOXON, Frank, HARTZELL, Albert, and WILCOXON, Fredericka. Insecticidal properties of extract of male fern (*Aspidium filix-mas* [L.] Sw.). *Contributions from Boyce Thompson Institute*, Menasha, Wisconsin, 1939, Vol. II, No. Pt. 1, pp. 1-4, fig. 1. Literature cited, p. 4.

Prof. UGO PAPI, Segretario generale dell'Istituto, Direttore responsabile.

INTERNATIONAL BULLETIN OF PLANT PROTECTION

DISCOVERIES AND CURRENT EVENTS *

PALESTINE.

Diseases of Ornamental Plants (concluded) †

| | | |
|------------------------------------|---|--------------------------------|
| <i>LAURUS NOBILIS</i> LINN. | <i>Alternaria</i> sp. | Leaf spot; black tip. |
| | <i>Fusarium</i> sp. | Blight; collar and root rot. |
| | <i>Gloeosporium</i> sp. | Associated with root rot. |
| | <i>Phoma</i> sp. | Associated with collar rot. |
| | <i>Rhizoctonia</i> sp. | Collar rot. |
| <i>LEPTOSPERMUM</i> sp. | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| | <i>Fusarium</i> sp. | Rot and sloughing off of bark. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar rot. |
| <i>LEVISTICUM OFFICINALE</i> KOCH. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>LIGUSTRUM LUCIDUM</i> AIT. | Leaf spot (non-parasitic). | |
| <i>L. OVALIFOLIUM</i> HASSK. | <i>Alternaria</i> sp. | Leaf spot. |
| <i>LIGUSTRUM</i> sp. | <i>Fusarium</i> sp. | Collar rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| | Leaf scorch (non-parasitic). | |
| | Leaf spot (non-parasitic). | |
| | Sunburn. | Twig. |
| | <i>Cuscuta</i> sp. | |

* Under this and the next heading the countries are arranged in French alphabetical order.

† Communication from the official correspondent of the Institute, Dr I. REICHERT, Chief Plant Pathologist, Division of Plant Pathology, Agricultural Research Station, Rehovot, Palestine.

| | | |
|--|--|----------------------------------|
| <i>LIPPIA NODIFLORA</i> MICHX. | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| <i>LIPPIA</i> sp. | <i>Pythium</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>LONICERA</i> sp. | Leaf yellowing (non-parasitic). | |
| <i>MAGNOLIA GRANDIFLORA</i> LINN. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | Black-tip of leaves (undetermined). | |
| <i>MAGNOLIA</i> sp. | Black-tip of leaves (non-parasitic). | |
| | Leaf drop (non-parasitic). | |
| | Leaf scorch (non-parasitic). | |
| | Leaf spot (non-parasitic). | |
| <i>MAMMILLARIA ELEGANS</i> DC. var. <i>SUPERTEXTA</i> . | <i>Fusarium</i> sp. | Collar rot. |
| <i>M. SCOLYMOIDES</i> SCHEIDW. | <i>Bacterium</i> sp. | Brown collar rot. |
| | <i>Fusarium</i> sp. | Brown collar rot. |
| <i>M. UNGINATA</i> ZUCC. | <i>Fusarium</i> sp. | Wilt. |
| <i>MAMMILLARIA</i> sp. | <i>Fusarium</i> sp. | Collar rot. |
| <i>MATTHIOLA</i> sp. | <i>Cladosporium</i> sp. | Leaf spot. |
| | <i>Fusarium</i> sp. | Collar rot; collar and root rot. |
| | Leaf drying (non-parasitic). | |
| | Yellowing and leaf spot (non-parasitic). | |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>MELALEUCA ARMILLARIS</i> SMITH. | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| <i>MELIA AZEDARACH</i> LINN. | <i>Bacterium tumefaciens</i> EFS. et Town. | Crown gall. |
| | Wither-tip (non-parasitic). | |
| <i>MESEMBRYANTHEMUM ACINACIFORME</i> LINN. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |

| | | |
|---|--|-----------------------------------|
| <i>MESEMBRYANTHEMUM</i> COR- <i>DIFOLIUM</i> LINN. var. VA- <i>RIEGATUM</i> . | <i>Fusarium</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| <i>MESEMBRYANTHEMUM</i> sp. | <i>Fusarium</i> sp. | Bark rot of stem. |
| | <i>Heterodera marioni</i> (Cor- nu) Goodey. | Root knot. |
| <i>MYRTUS COMMUNIS</i> LINN. | <i>Bacterium tumefaciens</i> EFS. et Town. | Crown gall. |
| | <i>Cercospora</i> sp. | Leaf spot. |
| | <i>Fusarium</i> sp. | Root rot, wilt, damp- ing off. |
| | <i>Oidium</i> sp. | Mildew. |
| | <i>Sclerotium bataticola</i> Taub. | Wilt and root rot. |
| | <i>Heterodera marioni</i> (Cor- nu) Goodey. | Root knot. |
| | | |
| <i>NARCISSUS</i> sp. | Leaf scorch (non-parasi- tic). | |
| <i>NEMESIA</i> sp. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Rot rot. |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| <i>OVERGONIA</i> sp. | <i>Fusarium</i> sp. | Collar and root rot. |
| <i>OPUNTIA FICUS-INDICA</i> MILL. | <i>Phyllosticta</i> sp. | Leaf spot. |
| <i>O. LEUCOTRICHA</i> DC. | <i>Bacterium</i> sp. | Black collar rot. |
| | <i>Fusarium</i> sp. | Root rot. |
| | <i>Heterodera marioni</i> (Cor- nu) Goodey. | Root knot. |
| | | |
| <i>O. RAPINESQUII</i> ENGELM. | <i>Bacterium</i> sp. | Collar rot. |
| <i>OPUNTIA</i> sp. | <i>Bacterium</i> sp. | Associated with collar rot. |
| | <i>Fusarium</i> sp. | Collar rot. |
| <i>OREODOXA OLERACEA</i> MART. | <i>Fusarium</i> sp. | Seed rot. |
| | <i>Melanospora</i> sp. | Associated with seed rot. |
| <i>PANDANUS UTILIS</i> BORY. | <i>Cladosporium</i> sp. | Leaf spot. |
| | <i>Fusarium</i> sp. | Leaf rot; collar rot. |
| | Leaf scorch. | Wind injury. |
| <i>PARKINSONIA ACULEATA</i> LINN. | <i>Rhizoctonia solani</i> Kühn. Wither-tip (non-parasitic). | Damping off. |

| | | |
|--|--|-----------------------------|
| <i>PLATANUS OCCIDENTALIS</i> LINN. | <i>Cladosporium</i> sp. | Sooty mould on leaves. |
| <i>PLUMBAGO CAPENSIS</i> THUNB. | <i>Alternaria</i> sp. | Wither-tip and leaf drying. |
| | <i>Fusarium</i> sp. | Root rot. |
| | <i>Phoma</i> sp. | Wither-tip and leaf drying. |
| | Gum spot (non-parasitic). | Twig. |
| | Leaf dry spot (non-parasitic). | |
| | Wither-tip (non-parasitic). | |
| <i>PLUMERIA ALBA</i> LINN. | <i>Alternaria</i> sp. | Leaf spot. |
| | <i>Phyllosticta</i> sp. | Leaf spot. |
| <i>POINCIANA REGIA</i> BOJ. | <i>Fusarium equiseti</i> (Corda) Sacc. | Collar rot. |
| | <i>Fusarium</i> sp. | Trunk, collar and root rot. |
| | <i>Oidium</i> sp. | Powdery mildew. |
| | <i>Pleospora</i> sp. | On stem. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| | Brown spot (non-parasitic). | Twig. |
| | Yellow leaf spot (? virus). | |
| <i>POLIANTHES TUBEROSA</i> LINN. | <i>Fusarium</i> sp. | Wilt, root rot, collar rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot; wilt. |
| <i>POPULUS</i> sp. | <i>Coniothecium complanatum</i> (Nees) Sacc. | Black stem spot. |
| | <i>Melampsora larici-populina</i> Kleb. | Rust. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>PORTULACA OLERACEA</i> LINN. | <i>Albugo candida</i> (Pers.) Ktz. | White rust. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>PYCNOSTACHYS DAWELIANA</i> N. F. BR. | <i>Fusarium</i> sp. | Root rot. |

| | | |
|-----------------------------------|--|---|
| <i>QUERCUS</i> sp. | <i>Fusarium</i> sp. | Collar and root rot. |
| | <i>Ganoderma</i> sp. | Root disintegration. |
| | <i>Phyllactinia corylea</i> (Pers.) Karst. | Mildew on leaves. |
| <i>RESEDA ODORATA</i> LINN. | <i>Cercospora resedae</i> Fckl. | Leaf spot. |
| | <i>Fusarium</i> sp. | Root rot. |
| <i>RICINUS COMMUNIS</i> LINN. | <i>Cercospora</i> sp. | Leaf spot. |
| | <i>Septoria</i> sp. | Leaf spot. |
| | <i>Uredo ricini</i> Biv.-Berm. | Rust. |
| | Browning and yellowing of leaves (undetermined). | |
| | Yellow leaf spot (undetermined). | |
| | <i>Cuscuta monogyna</i> Vahl. | |
| <i>ROBINIA PSEUD-ACACIA</i> LINN. | <i>Fusarium</i> sp. | Damping off. |
| | <i>Rhizoctonia solani</i> Kühn. | Damping off. |
| | Gum spots on upper leaf surface (non-parasitic). | |
| <i>ROSA CANINA</i> LINN. | <i>Phragmidium</i> sp. | Rust. |
| | <i>Sphaerotheca pannosa</i> (Wallr.) Lév. | Mildew. |
| <i>R. INDICA</i> LINDL. | <i>Bacterium tumefaciens</i> EFS. et Town. | Crown gall. |
| | <i>Fusarium</i> sp. | Root rot. |
| <i>R. LAXA</i> RETZ. | <i>Phragmidium mucronatum</i> Schlecht. | Rust. |
| <i>ROSA</i> sp. | <i>Ascochyta rosicola</i> Sacc. | Brown leaf spot. |
| | <i>Bacterium tumefaciens</i> EFS. et Town. | Crown gall. |
| | <i>Bacterium</i> sp. | Shrivelling of stem. |
| | <i>Botrytis</i> sp. | Brown twig spot. |
| | <i>Cercospora rosicola</i> Pass. | Leaf spot. |
| | <i>Diplodia</i> sp. | Collar and root rot. |
| | <i>Fusarium</i> sp. | Associated with <i>Rhizoctonia solani</i> and <i>Sclerotium bataticola</i> ; collar and root rot, wilt. |
| | <i>Pestalozzia</i> sp. | Leaf spot. |
| | <i>Phoma</i> sp. | Root rot. |
| | <i>Phragmidium subcorticium</i> (Schr.) Wint. | Rust. |

| | | |
|---|--|--|
| <i>Rosa</i> sp. (continued). | <i>Pleospora</i> sp. | Leaf and stem blight. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| | <i>Sphaerotheca pannosa</i> (Walr.) Lév. | Mildew. |
| | Black-tip (non-parasitic). | |
| | Wither-tip (non-parasitic). | |
| | Yellowing of leaves (non-parasitic). | |
| | <i>Cuscuta</i> sp. | |
| <i>ROSMARINUS OFFICINALIS</i> LINN. | <i>Alternaria</i> sp. | Associated with total drying of plants. |
| | Basidiomycetes. | Associated with <i>Rhizoctonia solani</i> ; collar and root rot. |
| | <i>Fusarium</i> sp. | Collar and root rot; wilt. |
| | <i>Pestalozzia</i> sp. | Associated with total drying of plants; blackening of leaves. |
| | <i>Phytophthora</i> sp. | Root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Total blight; root rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| | <i>Fusarium</i> sp. | Collar and root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | |
| <i>RUSSELLIA JUNCEA</i> ZUCC. | <i>Rhizoctonia bataticola</i> Taub. | Collar and root rot. |
| <i>SABAL GHIESBRECHTII</i> HORT. | Yellow transparent leaf spot (undetermined). | |
| <i>SALVIA SPLENDENS</i> KER.-GAWL. | Nematode (undetermined). | On leaves. |
| <i>S. TRILOBA.</i> | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>SAMBUCUS</i> sp. | <i>Cercospora</i> sp. | Leaf spot. |
| <i>SCHINUS TEREBINTHIFOLIUS</i> RADDI. | Drying of leaves (non-parasitic). | |
| <i>SEDUM</i> sp. | White dry leaf spots (non-parasitic). | |
| <i>SEQUOIA GIGANTEA</i> DC. | <i>Fusarium</i> sp. | Damping off. |

| | | |
|--|---|------------------------|
| <i>SPIRAEA FORTUNEI</i> PLANCH. | <i>Fusarium</i> sp. | Root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Root rot. |
| <i>STATICE</i> sp. | <i>Cercospora</i> sp. | Leaf and stem spot. |
| | <i>Oidium</i> sp. | Mildew. |
| <i>STILLINGIA SEBIFERA</i> MICHX. | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>STYRAX</i> sp. | <i>Fusarium</i> sp. | Wilt. |
| | <i>Phoma</i> sp. | Wilt. |
| | <i>Sclerotium bataticola</i> Taub. | Wilt. |
| <i>SYRINGA VULGARIS</i> LINN. | <i>Fusarium</i> sp. | Collar rot. |
| | Gum leaf spot (non-parasitic). | |
| | Leaf spot (undetermined). | |
| <i>TEPHROSIA CANDIDA</i> DC. | <i>Fusarium</i> sp. | Collar and root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| <i>THUJA</i> sp. | <i>Fusarium</i> sp. | Damping off, root rot. |
| | <i>Phoma</i> sp. | Blight. |
| | <i>Sclerotium bataticola</i> Taub. | Collar and root rot. |
| <i>TRACHYCARPUS EXCELSA</i> H. WENDL. | <i>Fusarium</i> sp. | Root rot. |
| <i>TROPAEOLUM MAJUS</i> LINN. | <i>Oidiopsis</i> sp. | Powdery mildew. |
| <i>VERBENA</i> sp. | Black-tip (non-parasitic). | |
| | Wither-tip (non-parasitic). | |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>VIBURNUM LUCIDUM</i> MILL. | Leaf spot (non-parasitic). | |
| <i>VINCA MINOR</i> LINN. | <i>Rhizoctonia solani</i> Kühn. | Collar and root rot. |
| | Dry leaf spot (undetermined). | |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>VIOLA ODORATA</i> LINN. | <i>Cercospora violae</i> Sacc. | Leaf spot. |
| | <i>Phyllosticta</i> sp. | Leaf spot. |
| | <i>Sclerotium bataticola</i> Taub. | Wilt. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |
| <i>V. TRICOLOR</i> LINN. | <i>Fusarium</i> sp. | Rot. |
| | <i>Heterodera marioni</i> (Cornu) Goodey. | Root knot. |

| | | |
|----------------------|--|----------------------------|
| WASHINGTONIA sp. | <i>Diplodia</i> sp. | Heart rot. |
| | <i>Fusarium</i> sp. | Heart and root rot. |
| | <i>Leptosphaeria</i> sp. | Leaf spot. |
| | <i>Phoma</i> sp. | Associated with heart rot. |
| | <i>Phyllosticta cocoina</i> Cooke. | Leaf spot. |
| | <i>Phytophthora</i> sp. | Heart rot, root rot. |
| | <i>Rhizoctonia solani</i> Kühn. | Root rot. |
| | <i>Septoria</i> sp. | Leaf spot. |
| | Brownish leaf spot (non-parasitic). | |
| | Transparent yellow leaf spot (undetermined). | |
| ZINNIA ELEGANS JACQ. | <i>Heterodera marioni</i> (Connu) Goodey. | Root knot. |
| | <i>Alternaria</i> sp. | Leaf spot, blackening. |
| | <i>Fusarium</i> sp. | Collar and root rot. |
| | <i>Oidium</i> sp. | Powdery mildew. |
| | <i>Rhizoctonia solani</i> Kühn. | Collar rot. |
| | Leaf spot (undetermined). | |
| | <i>Heterodera marioni</i> (Connu) Goodey. | Root knot. |
| | | |
| | | |
| | | |

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Germany. — A Circular of April 8, 1940 establishes the measures to be taken with a view to checking the damage caused by rabbits.

Although in some districts rabbits were completely exterminated through the exceptional cold of last winter, there are still some parts where these rodents are rampant, chiefly near large towns where valuable garden crops are damaged.

Those concerned are referred to the Game Law [see this *Bulletin*, 1934, No. 8, p. 181, and 1935, No. 6, p. 132] which authorizes proprietors of enclosed lands to kill any rabbits found on their grounds provided that the said proprietors have obtained a permit to that effect from the authorities in charge. This permit is now given to all proprietors and occupiers of enclosed land, application for same being unnecessary. The use of snares and poison bait, however, for the destruction of rabbits is prohibited. A written permit from the local authorities is required for the use of guns. Persons without a shooting licence may also be authorized to shoot rabbits, the presence of the proprietors of the land involved not being necessary.

Dead leaves, twigs, compost, etc. should be heaped onto some sort of grating raised from the ground so as to leave a space, thus depriving the rabbits of their favorite shelter. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1, September 1940, Bd. XII, Nr. 5, S. 99-100).

*** A Notification of August 24, 1940 relative to the modifications brought into force by Ordinance of October 8, 1937 [see this *Bulletin*, 1938, No. 2, pp. 28-29] regarding the control of the potato wart disease [*Synchytrium endobioticum*] states that the varieties 'Allerfrüheste Gelbe' and 'Centifolia' non-resistant to wart disease, which were authorized for cultivation in 1941 by Amendment of March 26, 1940 to the aforesaid Ordinance [see this *Bulletin*, 1940, No. 9, p. 165] may also be cultivated in 1942. Seedlings of these varieties may be sold up to July 1, 1942. (*Ibid.*, S. 97-98).

*** The former Free City of Danzig being, by virtue of the Law, dated September 1, 1939, incorporated in the Reich, all legislative regulations, including phytosanitary measures [see this *Bulletin*, 1935, No. 2, p. 37; No. 6, pp. 135-136; No. 11, p. 252; 1936, No. 10, p. 222] taken previous to this date have been abrogated. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin, Anfang September 1940, 20. Jahrg., Nr. 9, S. 56).

*** As the customs frontier between Germany and the Protectorate of Bohemia and Moravia was abolished on October 1, 1940, the Minister of Agriculture by Order of September 25, 1940, has established that nursery plants (ornamental and deciduous fruit trees) from the Protectorate and intended for import into Germany, must be disinfected and accompanied by an official certificate testifying that they have been treated with toxic gas.

The importation of vines from the Protectorate remains prohibited.

The abolition of the former customs frontier entails the abolition of all other phytosanitary prescriptions and restrictions.

Consignments from abroad arriving at the frontier of the Protectorate and intended for dispatch to German customs territory will be examined by the Plant Inspection Service of the Protectorate with effect for the entire German customs territory. (*Ibid.*, Anfang Oktober 1940, Nr. 10, S. 68).

Germany (Bavaria). — By Decree of July 25, 1940, the occupiers of farm lands are required to carry out control measures against sparrows when, by request of the district Plant Protection Service, the administrative authorities declare control compulsory and delimit the areas wherein the measures in question are to be carried out. Control should be effected according to the instructions of the Plant Protection Service. The administrative authorities may commission an officer of the Plant Protection Service to supervise the necessary control operations, costs being paid by the land owners or occupiers.

Children under 14 are not to be employed in capturing sparrows and destroying their nests. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. September 1940, Bd. XII, Nr. 5, S. 100).

*** A Notification of the same date establishes that the organization and supervision of sparrow control as also the measures to be adopted are incumbent on the Plant Protection Service. (*Ibid.*, S. 101).

Germany (Ostmark). — Published on July 20 and August 7, 1940 respectively, new regulations—based on the Decree of November 21, 1939 relative to the control of the San José scale [*Aspidiotus perniciosus*: see this *Bulletin*, 1940, No. 5, p. 103]—establish the measures to be observed firstly, in the disinfection of nursery plants by toxic gas, and secondly, in the supervision of nurseries in former Austria. (*Ämtliche Pflanzenschutzbestimmungen*, Berlin, 1. September 1940, Bd. XII, Nr. 5, S. 101-104).

Spain. — A Decree of August 13, 1940 reorganizes the Plant Protection Service now known as the 'Servicio de Fitopatología y Plagas del Campo'.

Research work and experiments are carried out by the Stations ('Estaciones de Fitopatología Agrícola') under the direction of the Institute of Agricultural Research.

All other work (phytopathological inspection and control, supervision of the trade in and manufacture of insecticides and fungicides, demonstration and propaganda work, execution of control operations, etc.) is entrusted to the 'Secciones de Fitopatología y Plagas del Campo' of the provincial 'Jefaturas de Agricultura' under the direct supervision of Section III of the Department of Agriculture. The Chief of Section III is also Chief of the Service.

The inland, port and frontier phytosanitary stations are also under the direct supervision of the aforesaid Section III. These stations carry out disinfection and other treatments of plants and agricultural products which are used either for national or international purposes, as well as phytopathological inspection at the ports or frontiers designated by the Ministry of Agriculture, independently of any other examination to which the plants or products may have been subjected before their entry into or egress from Spain.

The authorities and farmers are required to report all crop parasites found, in particular the 'plagas de calamidad pública' and those the control of which is of national interest and importance. In this case, the State will contribute towards the expenses involved in control operations. (*Boletín Oficial del Estado*, Madrid, 4 de septiembre de 1940, año V, núm. 248, págs. 6175 a 6178).

*** In view of the presence of the yellow stalk borer (*Sesamia vuleria*) in Andalusia, an 'orden' of September 5, 1940 states that all stalks of maize, millet and sorghum must be uprooted and burnt before November 1, 1940. (*Ibid.*, 11 de septiembre de 1940, núm. 255, pág. 6330).

United States of America. — Amendment No. 2 to the rules and regulations (seventeenth revision) supplemental to Notice of Quarantine No. 48 on account of the Japanese beetle [*Popillia japonica*], approved on April 4, 1940

and effective on April 5, 1940, concerns the revision of regulations 3, 5, and 6 and the reprinting of regulations 7 and 9 [see also this *Bulletin* 1940, No. 1, p. 10]. (*B. E. P. Q.* - *Q.* 48, [Washington, D. C.], 1940, 9 pp.).

Italy. — Ministerial Decree of August 14, 1940 authorizes hunting and capture of rooks, hooded crows, jackdaws, jays, shrikes and bee-eaters (the latter only in the proximity of bee-hives), declared pests, in the Province of Sassari. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 30 agosto 1940, anno 81^o, n. 203, pp. 3222-3223).

RECENT BIBLIOGRAPHY

AGATI, Julian A., and DE PERALTA, Fernando. Rice *cadang-cauang* in Albay Province: II. Fertilizer treatments. *The Philippine Journal of Agriculture*, Manila, 1939, Vol. 10, No. 3, pp. 271-283. Literature cited, p. 283.
[This disorder of rice is largely the result of plant food deficiency in the soil, particularly nitrogen].

ANET, H. La défense des cultures contre les dommages du gel en Valais, en 1938 et 1939. *Revue Horticole Suisse*, Châtelaine-Genève, 1939, XII^e année, n^o 10, p. 220-221, 1 fig.; n^o 11, p. [241]-243.

ARNOLD, H. C. Pyrethrum. *The Rhodesia Agricultural Journal*, Salisbury, 1939, Vol. XXXVI, No. 10, pp. 732-739.
[*Chrysanthemum cinerariacifolium*].

ASKEW, H. O., and WILLIAMS, W. R. Lloyd. Brown-spotting of apricots, a boron-deficiency disease. *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 2 A, pp. 103 A-106 A, fig. 1. References, p. 106 A.

ATTIA, Rizk, & MATTAR, Bishara. Some notes on "the potato tuber moth" (*Phthorimaea operculella*, Zell.). *Ministry of Agriculture, Egypt. Technical and Scientific Service. Entomological Section. Bulletin No. 216*, Cairo, 1939, 136 pp., 41 figs. Literature as recorded by the Review of Applied Entomology, pp. 115-136.

AYERS, G. W., and HURST, R. R. Verticillium wilt of potatoes in Prince Edward Island. *Scientific Agriculture*, Ottawa, Canada, 1939, Vol. XIX, No. 12, pp. 722-735, figs. 1-9. References, p. 735.
[*Verticillium albo-atrum*].

BABARAN, José M. Pasture weeds and cost of removing them by cutting. *The Philippine Agriculturist*, Laguna, P. I., 1939, Vol. XXVIII, No. 6, pp. 504-520. Literature cited, p. 519.

BALBACH, Hans. Untersuchungen über die Reisigkrankheit der Weinrebe. 2. Mitteilung: Der stoffliche Aufbau der Zellstäbe, mit besonderer Berücksichtigung des Zentralfadens. *Wein und Rebe*, Mainz 1939, 21. Jahrg., Nr. 10/11, S. 318-340, Abb. 1-12. Literaturverzeichnis, S. 339.
[With title and summary also in Italian: "Ricerche sull'arricciamento della vite. Comunicazione II: Sulle sostanze costituenti i cordoni endocellulari con particolare riguardo al cordone centrale"].

BALDWIN, Henry I. The European spruce sawfly in New Hampshire 1938. *Journal of Forestry*, Washington, D. C., 1939, Vol. 37, No. 11, pp. 876-878.
[*Diprion polytomum*].

- BANU, C. Un dușman al semincerilor de tutun: larva fluturului *Heliothis obsoleta* F. *Buletinul cultivării și fermentării Tutunului*, București-Băneasa 1939, an. XXVIII, nr. 3, pag. 344-350, fig. 1-5. Bibliografie, pag. 350.
- BELLIO, G. Esperimenti di lotta invernale con anidride solforosa contro la cocciniglia cotonosa (*Pseudococcus citri*) sulla vite. *Annali della Facoltà di Agraria della R. Università di Napoli*, Portici, 1940, ser. III, vol. XII (1941), pp. [207]-240, figg. 1-6, tav. I-IV. Bibliografia, p. 239.
- BENILOCH MARTÍNEZ, Miguel. Notas sobre *Aglaope infausta* L. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. [1] a 6, figs. 1-4.
- BENILOCH [MARTÍNEZ], Miguel, y DOMINGUEZ, Francisco. La lucha contra la mosca de las cerezas, *Rhagoletis cerasi* (L.) Loew. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 7 a 14, figs. 1-3. Bibliografía, pag. 14.
- BESHIR, M., and HOSNY, M. Some mealy bugs of Egypt and experiments on their control by means of chemicals. *Ministry of Agriculture, Egypt. Technical and Scientific Service. Entomological Section. Bulletin No. 209*, Cairo, 1939, 16 pp. References, p. 16.
[*Phenacoccus hirsutus*, *Pseudococcus citri*, *Ps. filamentosus*, *Ps. sacchari*, *Icerya aegyptiaca*, *I. purchasi*].
- BEST, Rupert J. Plant viruses. The influence of recent knowledge on methods for their control. *The Journal of the Australian Institute of Agricultural Science*, Sydney, 1939, Vol. 5, No. 3, pp. 162-168.
- BIRAGHI, A[ntonio]. Un marciume della lattuga prodotto da "Pythium". *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 119-124, fig. 1, tav. VI.
- BLUNCK, H. Die Rapsglanzkäferschäden. *Mitteilungen für die Landwirtschaft*, Berlin 1940, 55. Jahrg., Heft 30, S. [533]-535, Abb. 1-13; Heft 31, S. 561.
[*Meligethes aeneus*].
- BOGATOVA, Z. K. Toxicity of rotenone bearing Tephrosia. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 14, pp. 1-[14]. [Bibliography], p. [14].
[In Russian, with title also in English].
- BOHORQUEZ, Rafael. Experiencias de lucha contra la mosca del olivo (*Dacus oleae* Rossi) por medio de sustancias atractivas. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 125 a 139, 9 gráficos.
- BOIS, Eric-J. Les rosiers et leur résistance aux maladies qui les atteignent. *Revue Horticole Suisse*, Châtellaine-Genève, 1939, XII^e année, n.º 11, p. 247-250.
- BORZINI, G[iovanni]. Sulle cause di una moria di piante di vite. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 137-146, figg. 1-6.
[These investigations point to a physiological disharmony between stock and scion].
- BOYCE, A. M., KAGY, J. F., MCCALL, G. L., and LADUE, J. P. Black scale control. Summary of studies with low dosages of oil with rotenone-bearing materials. *The California Citrograph*, Los Angeles, 1940, Vol. 25, No. 10, pp. 314, 342-344.
[*Saissetia oleae*].
- BROADFOOT, H. Black spot development of apples in cold storage. *The Agricultural Gazette of New South Wales*, Sydney, 1939, Vol. L, Pt. 8, pp. 445-446.
[*Venturia inaequalis*].

- BRUDNAIA, A. A. Natural enemies of *Bruchus pisorum* L. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 12, pp. 6-10, figs. 1-4. [Bibliography], p. 10. [In Russian, with title also in English].
- BUA, Gaetano. Ulteriori esperimenti con sostanze attrattive per la mosca delle olive. *L'Olivicoltore*, Roma, 1940, anno XVII, n. 7, pp. 13-21. [*Dacus* (*Daculus*) *oleae*].
- BUCHANAN, T. S. Fungi causing decay in wind-thrown northwest conifers. *Journal of Forestry*, Washington, D. C., 1940, Vol. 38, No. 3, pp. 276-281. Literature cited, p. 281.
- CAMPBELL, W. A., and DAVIDSON, Ross W. Sterile conks of *Polyporus glomeratus* and associated cankers on beech and red maple. *Mycologia*, Lancaster, Pa., 1939, Vol. XXXI, No. 5, pp. 606-611, figs. 1-2.
- CARIMINI, M. La tignola orientale del pesco. *Rivista della R. Società Toscana d'Orticoltura*, Firenze, 1939, anno 64.^{mo}, vol. XXIV, n° 3-4, pp. 64-65. [*Cydia molesta*].
- CARN, K. G. Weed control in the Western Lands Division. *The Agricultural Gazette of New South Wales*, Sydney, 1939, Vol. L, Pt. 8, pp. 421-424, 4 figs.
- CARROLL, J. The incidence of eelworm pests in Eire. *Agricultural Progress*, Shrewsbury, 1939, Vol. XVI, Pt. IV, pp. 207-211. [*Anguillulina tritici*, *A. dipsaci*, *Heterodera schachtii*, *H. marioni*, *Aphelenchoides fragariae*, *A. ritzeana-bosi*].
- CHAMBERLAIN, R. E. Cucumber-mosaic (*Cucumis virus* I of Smith, 1937). *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 2 A, pp. 73 A-90 A, figs. 1-7. References, p. 90 A.
- CHAMBERLAIN, R. The chrysanthemum midge in Northern Ireland. *Agricultural Progress*, Shrewsbury, 1939, Vol. XVI, Pt. II, pp. 202-206. [*Diarthronomyia*].
- CIPERRI, R[affaele]. Le malattie della manioca ("Manihot esculenta" Crantz) in San Domingo. III. Identità e nomenclatura delle "Cercospora" viventi sulle "Manihot". *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 99-114, figg. 1-2, tav. I-V. [For the two previous memoirs, see this *Bulletin*, 1933, No. 11, p. 258. — *Cercospora henningsii* Allescher, *C. caribaea* Chupp et Cif.].
- CIPERRI, Raffaele, [e] GADDINI, Leopoldo. Il marciume delle Musa da *Bacterium solanacearum* nell'oasi di Derna. *L'Agricoltura Coloniale*, Firenze, 1939, anno XXXIII, n. 9, pp. 531-535, figg. 1-5. Letteratura citata, p. 535.
- CORTES P., Raul. La araña roja y su control. *El Agricultor del Norte*, La Serena, 1939, año 25, n° 9, págs. 218 y 219. [*Tetranychus telarius*].
- DAVIS, W. C., YOUNG, George Y., and ORR, Leslie W. Needle droop of pine. *Journal of Forestry*, Washington, D. C., 1939, Vol. 37, No. 11, pp. 884-887, fig. 1. [This disorder appears to be the result of unfavourable factors, such as drought, heat, or frost].
- DEL CAÑIZO, José. Pentatómidos perjudiciales al trigo. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n°s 31, 32, 33 y 34, págs. 15 a 26, figs. 1-10. Bibliografía, pág. 26. [*Aelia rostrata*, *Eurygaster* sp. nov.].

- DEL CAÑIZO, José. Las plagas de langosta en España. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 27 a 48, figs. 1-12.
[*Doclostaurus maroccanus*, *Calliptamus italicus*, *Pachytillus cinerascens*, *Oedaleus decorus*, *Oedipoda coerulescens*, *Prionotropis flexuosa*].
- DELGADO DE TORRES, Demetrio. Pérdidas causadas en frutales y olivos por los insectos en España. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 57 a [64].
- DELGADO DE TORRES, Demetrio. Estudio económico de los tratamientos contra la mosca del olivo, *Dacus oleae* Rossi. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 140 a 149.
- DEPARTMENT OF HORTICULTURE AND ILLINOIS STATE NATURAL HISTORY SURVEY. Directions for spraying fruits in Illinois. *University of Illinois. College of Agriculture. Agricultural Experiment Station and Extension Service in Agriculture and Home Economics in Cooperation with the Illinois State Natural History Survey. Circular 492*, Urbana, Illinois, 1939, 32 pp., 6 figs.
- DEV, P. K., and SINGH, U. B. The stem-black disease of apple in Kumaun. *The Indian Journal of Agricultural Science*, New Delhi, 1939, Vol. IX, Pt. V, pp. 703-710, pls. XXXII-XXXIII. References, p. 710.
[*Coniothecium chomatosporum*].
- DOBROHLEB, J. F. Acroptilan Picris C. A. M. and measures for its control. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 13, pp. 7-[9]. [Bibliography], p. [9].
[In Russian, with title also in English].
- D'OLIVEIRA, Branquinho. Notas sobre a produção da fase aecidica de algumas ferrugens dos cereais em Portugal. *Revista Agronómica*, Lisboa, 1940, vol. XXVIII, n.º 2, págs. [201]-208.
[With summary in English. — *Puccinia rubigo-vera tritici*, *P. rubigo-vera secalis*, *P. coronata avenae*].
- D'OLIVEIRA, Maria de Lourdes. Os virus como parasitas. *Revista Agronómica*, Lisboa, 1940, vol. XXVIII, n.º 2, págs. [188]-200. Referências bibliográficas, págs. 199-200.
- DUMBLETON, L. J. Contribution to the physical ecology of *Tortrix postvittana*, Walk. (Lep.). *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 309-319, figs. 1-2.
- DYKSTRA, T. P. A comparative study of American and European potato virus diseases. *American Potato Journal*, Sommerville and New Brunswick, N. J., 1939, Vol. 16, No. 11, pp. [281]-287. Literature cited, p. 287.
- EL-HELALY, A. F. Studies on the control of kernel smut of sorghum. *Ministry of Agriculture, Egypt. Technical and Scientific Service. Plant Pathological Section. Bulletin No. 233*, Cairo, 1939, 22 pp., 3 figs. Literature cited, pp. 21-22.
[*Sphacelotheca sorghi*].
- EL-HELALY, A. F. Further studies on the control of bean rust with some reference to the prevention of chocolate spot of beans. *Ministry of Agriculture, Egypt. Technical and Scientific Service (Plant Pathological Section). Bulletin No. 236*, Cairo, 1939, 24 pp. References, p. 24.
[*Uromyces appendiculatus*, *Botrytis* sp.].
- ELLIOTT, Charlotte, and POOS, F. W. Seasonal development, insect vectors, and host range of bacterial wilt of sweet corn. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 10, pp. 645-686, figs. 1-2. Literature cited, p. 686.
[*Aplanobacter stewartii*].

- ERMOLAEV, M. F. The flax pest (*Thrips linarius* Uzel). *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 10, pp. 33-37, figs. 1-5.
[In Russian, with title also in English].
- EVANS, J. W. A new species of *Dieuches*, Dohrn (Hem. Lygaeidae) injurious to strawberries in Tasmania. *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 305-306, fig. 1. References, p. 306.
[*D. raphaeli* n. sp. English description].
- EVENDEEN, James C., and GIBSON, A. L. A destructive infestation in lodgepole pine beetle. *Journal of Forestry*, Washington, D. C., 1940, Vol. 38, No. 3, pp. 271-275, figs. 1-2.
[*Dendroctonus monticolae* on *Pinus murrayana*].
- FENNAH, R. G. A summary of experimental work on varietal resistance of sugarcane to *Tomaspis saccharina* 1936-39. *Tropical Agriculture*, Trinidad, B. W. I., 1939, Vol. XVI, No. 10, pp. 233-240, figs. 1-2. References, p. 240.
- FIKRY, Amin. Water-table effects. IV. — Relative incidence on cucurbits. *Ministry of Agriculture, Egypt. Technical and Scientific Service (Plant Pathological Section). Bulletin No. 221*, Cairo, 1939, 9 pp., 6 figs., 13 pls. Literature cited, p. 9. [See also this *Bulletin*, 1937, No. 10, p. 234. — *Erysiphe cichoracearum* on *Cucurbita pepo*; *Colletotrichum lagenarium* on *Citrullus vulgaris*].
- FIKRY, Amin. Study and control of antirrhinum rust. *Ministry of Agriculture, Egypt. Technical and Scientific Service. Section of Plant Pathology. Bulletin No. 223*, Cairo, 1939, 16 pp., 21 pls. Literature cited, pp. 15-16.
[*Puccinia antirrhini*].
- FLOR, H. H. New physiologic races of flax rust. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 9, pp. 575-591. Literature cited, p. 591.
[*Melampsora lini*].
- FRANÇOIS, Louis. Dissémination des mauvaises herbes. *Comptes rendus hebdomadaires des séances de l'Académie d'Agriculture de France*, Paris, 1939, tome XXV, n° 24, p. 883-885.
- FRANCOLINI, F. Il vaiuolo dell'olivo. La calciocianamide come mezzo di lotta. *Giornale di Agricoltura della Domenica*, Roma, 1940, anno I, n. 34, p. 292.
[*Cycloconium oleaginum*].
- FRANK, A. Der Maikäferflug 1939 im Bienwald. Bericht über die Messungen des Meteorologischen Institutes der forstlichen Versuchsanstalt in München während des Maikäferfluges 1939 im Bienwald. *Forstwissenschaftliches Centralblatt*, Berlin 1939, 61. Jahrg., Heft 19-21, S. [581]-598, Abb. 1-5.
[*Melolontha*].
- GADD, C. H. A virus disease of tea. *The Tea Quarterly*, St. Coombs, Talawakelle, 1939, Vol. XII, Pt. III, pp. 110-130, figs. 1-2.
- GADD, C. H. A destructive root disease of tea caused by the nematode *Anguillulina pratensis*. *The Tea Quarterly*, St. Coombs, Talawakelle, 1939, Vol. XII, Pt. III, pp. 131-139, figs. 1-4. References, p. 139.
- GARCÍA RADA, German. La enfermedad de la "antracnosis del mango". *Ministerio de Fomento. Dirección de Agricultura y Ganadería. Instituto de Altos Estudios Agrícolas del Perú. Estación Experimental Agrícola de La Molina. Circular No. 50*. Lima-Perú, 1939, 7 págs., 3 figs. Literatura consultada, pág. [7].
[*Colletotrichum gloeosporioides*].
- GARMENDIA, Juan Ortiz. Pérdidas en los almácigos de ají. *El Agricultor del Norte, La Serena*, 1939, año 25, n° 9, págs. 220 y 221.
[*Pythium de Baryanum*].

- GARRETT, S. D. Losses to world agriculture through root disease of crops. *Chemistry & Industry*, London, 1939, Vol. 58, No. 43, pp. 953-958, 4 figs. Bibliography, p. 958.
[*Botrytis* spp., *Fusarium* spp., *Synchytrium endobioticum*, *Ophiobolus graminis*, *Armillaria mellea*, *Phymatotrichum omnivorum*, etc.]
- GHIDINI, Gian Maria. Materiali per una bibliografia zoologica dell'Africa Orientale Italiana. *Rivista di Biologia Coloniale*, Roma, 1940, vol. III, fasc. IV, pp. [311]-316.
[For the three preceding bibliographical lists prepared by the same author, see this *Bulletin*, 1939, No. 10, p. 246 and 1940, No. 1, p. 13, No. 5, p. 109].
- GHILLINI, C. A. Cancro delle gardenie. *Rivista della R. Società Toscana d'Orticoltura*, Firenze, 1939, anno 64^{mo}, vol. XXIV, n° 7-8, pp. 145-149, figg. 1-5. Bibliografia, p. 149.
[*Phomopsis gardeniae*].
- GIGANTE, R[oberto]. Una laciniatura delle foglie di pesco causata dal freddo. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 125-136, figg. 1-7, tav. VII. Bibliografia, pp. 135-136.
- GINAI, M. Asghar. A note on Botrytis-rot of grapes in the Quetta Valley. *The Indian Journal of Agricultural Science*, New Delhi, 1939, Vol. IX, Pt. V, pp. 719-725, fig. 1, pls. XXXV-XXXVII. References, pp. 724-725.
[*Botrytis vulgaris*].
- GLÖCKNER, Günther. Untersuchungen über die "Sang"-Krankheit der Kartoffeln in Rheingau. *Angewandte Botanik*, Berlin 1940, Bd. XXII, Heft 3, S. [201]-252, Abb. 1-13, Literaturverzeichnis, S. 251-252.
[*Verticillium albo-atrum* apparently associated with *Fusarium* spp. and *Botrytis cinerea*].
- GOIDÀNICH, Athos. A proposito della zigena della vite (*Theresimima ampelophaga* Bayle-Barelle) in Italia. *Bollettino della Società Entomologica Italiana*, Genova, 1940, vol. LXXII, n. 1, pp. 3-9, figg. 1-II. Opere consultate, pp. 8-9.
- GOIDÀNICH, Gabriele. La grafiosi dell'olmo. Verso la fase risolutiva del problema. *Giornale di Agricoltura della Domenica*, Roma, 1940, anno I, n. 7, p. 51, 3 figg. [Graphium ulmi].
- GÓMEZ CLEMENTE, Federico. Experiencias de lucha contra la *Ceratitis capitata* con cazamoscas de vidrio. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VII-1936, n°s 31, 32, 33 y 34, págs. 99 a 117, figs. 1-3, 4 gráficos. Bibliografía, págs. 116 y 117.
- GÓMEZ CLEMENTE, Federico, y GONZÁLEZ REGUERAL, Francisco. Rectificación de las tablas actualmente utilizadas en la fumigación cianhídrica de los agrios en España. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n°s 31, 32, 33 y 34, págs. 197 a 214, figs. 1-II. Bibliografía, págs. 213 y 214.
- GONTAEV, A. F. Viability of seed of clover *Cuscuta* isolated from manure. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 10, pp. 29-[32].
[In Russian, with title also in English].
- GONZÁLEZ DE ANDRÉS, Carlos. Las plagas del olivo en España. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n°s 31, 32, 33 y 34, págs. 118 a 124, 1 mapa. Bibliografía, págs. 123 y 124.
[*Dacus* (*Daculus*) *oleae*, *Clinodiplosis oleisuga*, *Hysteropterum grylloides*, *Euphyllura olivina*, *Saissetia oleae*, *Lepidosaphes ulmi*, *Aspidiotus hederac*, *Liothrips oleae*, *Prays oleellus*, *Phloeotribus scarabaeoides*, *Hylesinus oleiperda*].

- HALL, Arthur. Catalogue of the Lepidoptera Rhopalocera (butterflies) of British Guiana. *The Agricultural Journal of British Guiana*, Georgetown, 1939, Vol. X, No. 1, pp. [25]-41, pl. VIII; No. 2, pp. [96]-104; No. 3, pp. [146]-169.
- HANNA, A. D. The pomegranate fruit butterfly, *Virachola livia* Klug. Morphology, life-history and control. *Ministry of Agriculture, Egypt. Technical and Scientific Service. Entomological Section. Bulletin No. 186*, Cairo, 1939, 54 pp., 42 figs., 4 graphs, 5 pls., 1 map. References, pp. 52-54.
- HAYWARD, Kenneth J. Un plan para catalogar las varias especies de moscas dañinas a las frutas en la Argentina y establecer su dispersión geográfica como base del estudio de su control. Concertación de una acción cooperativa. *Boletín de Agricultura y Ganadería*, Córdoba, 1939, año 1939, n.º 173, págs. 8 a 10.
- HENDRICKX, Fred. I. Observations sur la maladie verruqueuse des fruits du caféier. *Publications de l'Institut National pour l'Etude Agronomique du Congo Belge (I. N. E. A. C.). Série scientifique N° 19*, Bruxelles, 1939, 12 p., 3 fig. [*Botrytis cinerea* f. *coffecae* n. f.].
- HENDRICKX, Fred. L. Les maladies cryptogamiques du caféier (*Coffea arabica* L.) au Kivu. *Annales de Gembloux*, Boitsfort, 1940, 46^e année, 1^{re} livr., p. [11]-19.
- HERRICK, J. Arthur. The growth of *Stereum gausapatum* Fries in relation to temperature and acidity. *The Ohio Journal of Science*, Columbus, Ohio, 1939, Vol. XXXIX, No. 5, pp. 254-258. Literature cited, p. 258.
- HOFMANN, Christoph. Ein neues Kontaktstäubemittel ("Nemotan") gegen Nonne und Kiefernspanner. (Vorläufige Mitteilung). *Forstarchiv*, Hannover 1940, 16. Jahrg., Heft 1, S. 8-11. [*Lymantria monacha*, *Bupalus piniarius*].
- HOPKINS, J. C. F. Mycological notes. 12. The *Diplodia* danger. *The Rhodesia Agricultural Journal*, Salisbury, 1939, Vol. XXXVI, No. 10, pp. 721-723. [On maize].
- JEFFREYS, F. J. A new pest of raspberry in New Zealand (*Priophorus tener* Zaddach). *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, Vol. XXI, No. 2A, pp. 107A-113A, figs. 1-8. References, p. 113A.
- JEFFREYS, F. J. The raspberry-bud moth (*Carposina adreptella* Walk.). *The New Zealand Journal of Science and Technology*, Wellington, N. Z., 1939, vol. XXI, No. 2A, pp. 114A-125A, figs. 1-11. References, p. 125A.
- JEPSON, W. F. Progress in parasite importation during 1938. *La Revue Agricole de l'île Maurice*, Maurice, 1939, n° 105, p. 82-84. [Parasites of *Phytalus smithi*, *Aspidiotus destructor*, *Icerya seychellarum*, *Pseudococcus* spp., *Diatraea venosata*, etc.].
- JONES, G. Howard. Systematic and automatic warm water steeping to control loose smut of wheat. *Ministry of Agriculture, Egypt. Technical and Scientific Service. Mycological Section. Bulletin No. 220*, Cairo, 1939, 12 pp., 10 pls. Literature cited, p. 12. [*Ustilago tritici*].
- JONES, Leon K., VINCENT, C. L., and BURK, Earl F. The resistance of progeny of Katahdin potatoes to viroses. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 9, pp. 631-644, figs. 1-5. Literature cited, p. 644.
- KIESSELBACH, T. A., and LYNES, W. R. The effects of stinking smut (bunt) and seed treatment upon the yield of winter wheat. *College of Agriculture. University of Nebraska. Agricultural Experiment Station. Research Bulletin 110*, Lincoln, Nebraska, 1939, 22 pp. Literature cited, p. 22. [*Tilletia levis* and *T. tritici*].

- KUMAR, L. S. S. A note on *Pennisetum typhoideum* Rich. (*bajri*) affected by *Striga densiflora* Benth. *Current Science*, Bangalore, 1939, Vol. 8, No. 8, pp. 364-365, figs. 1-2.
- LARSON, R. H., and WALKER, J. C. A mosaic disease of cabbage. *Journal of Agricultural Research*, Washington, D. C., 1939, Vol. 59, No. 5, pp. 367-392, figs. 1-15. Literature cited, pp. 390-392.
[On *Brassica oleracea capitata*].
- LONG, W. H., & GOODING, L. N. Two new species of rust. *Mycologia*, Lancaster, Pa., 1939, Vol. XXXI, No. 6, pp. 670-673, fig. 1.
[*Ravenelia dysocarpe* on *Mimosa dysocarpa*; *Gymnosporangium vauqueliniae* on *Vauquelinia californica* and *Juniperus monosperma*. Latin diagnoses].
- MACLEOD, G. F. A review of the potato insect problems in New York State. *American Potato Journal*, Sommerville and New Brunswick, N. J., 1939, Vol. 16, No. 9, pp. 232-236.
- MALENOTTI, E[ttore]. I parassiti animali dei cereali. Roma, Ramo Editoriale degli Agricoltori, 1940, 73 pp., 23 figg., 8 tav. (Biblioteca per l'insegnamento agrario professionale. N. 98). Lire 3,50.
- MALENOTTI, E[ttore]. Precisazioni sui parassiti del sorgo. *L'Industria Saccarifera Italiana*, Genova, 1940, anno XXXIII, n. 7, p. 248.
- MALENOTTI, E[ttore]. Ancora sul sotterramento dell'esca contro le grillotalpe. *Bullettino dell'Agricoltura*, Milano, 1940, anno 74^o, n. 36, p. 2.
[See also this *Bulletin*, 1940, No. 10, p. 202].
- MALENOTTI, Ettore. La lotta contro gli insetti: le fumigazioni cianidriche. Come si eseguono. Le proprietà dell'acido cianidrico. Gli insetti contro i quali sono efficaci le fumigazioni. *Giornale di Agricoltura della Domenica*, Roma, 1940, anno L, n. 1, p. 3, 2 figg.
- MALENOTTI, Ettore. L'agricoltura contro gli insetti. (Seconda edizione). Roma, Ramo Editoriale degli Agricoltori, 1940, 406 pp., 46 figg., 4 tav. Bibliografia, pp. [389]-406. Prezzo L. 20.
[This second edition, revised and enlarged, reviews the relations between insects and plants, insects and soil, insects and agricultural operations; in many cases, these offer possibilities of effective control, sometimes, the only means of control of the plant pests].
- MANDELSON, L. F., and TOMMERUP, E. C. Yellow patch of tobacco seedlings. *Queensland Agricultural Journal*, Brisbane, 1939, Vol. LII, Pt. 3, pp. 280-294, pls. 120-124.
[A physiological disease].
- MARSHALL, GUY A. K. New injurious Curculionidae from southern Africa. *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 359-363, pl. XIII.
[*Tanymecus rapax* n. sp. damaging maize seedlings in South Rhodesia; *Scioebius mordax* n. sp. damaging leaves of litchi trees in Natal; *Glyptosomus angulatus* n. sp. feeding on leaves of litchi trees in Zululand; *Lagetes edax* n. sp. damaging young pine trees in Natal; *Tanyremnus fallax* n. sp. damaging young plants of *Pinus taeda* in the Cape Province. English descriptions].
- MCINTYRE, H. L. Report on forest pest problems in New York. *Journal of Forestry*, Washington, D. C., 1939, Vol. 37, No. 11, pp. 879-883.
- MEHTA, P. R. A fruit rot of apples caused by a species of *Rhizopus*. *The Indian Journal of Agricultural Science*, New Delhi, 1939, Vol. IX, Pt. V, pp. 711-718, figs. 1-2, pl. XXXIV. References, p. 718.
[*Rhizopus arrhizus* ?].

MELIS, Antonio. L'estratto di semi di lupino nella lotta contro gli Afidi. *Rivista della R. Società Toscana d'Orticoltura*, Firenze, 1939, anno 64.^{mo}, vol. XXIV, n° 7-8, pp. 142-144.

MENDIZÁBAL, VILLALBA, Manuel. Notas para un estudio de las especies españolas del género *Vesperus* (Col. Ceram.) *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n°s 31, 32, 33 y 34, págs. 65 a 86, figs. 1-23. Bibliografía, págs. 82 a 86.

METCALFE, G. A bacterial disease of Forsythia. *Nature*, London, 1939, Vol. 144, No. 3660, p. 1050.
[A disease apparently caused by *Pseudomonas syringae*].

MILLER, N. C. E. A new Malayan species of *Helopeltis* (Rhynchota, Capsidae). *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 343-344, fig. 1. [*H. theobromae* n. sp. on *Theobroma cacao* and *Bixa orellana*. English description].

MIOTTO, G. L'irrorazione meccanica ai barbatellai. *Il Gazzettino Agricolo*, Padova, 1940, anno XIII, n. 35, p. [2], 3 figg.
[Treatment of vine rooted cuttings against downy mildew (*Plasmopara viticola*)].

MO, Tjoa Tjen. Aanteekeningen over de parasieten van Hidari irava in verband met de oecologie dezer plaag. *Landbouw, Buitenzorg* 1939, XV jaarg., no 8, blz. [493]-509, 13 afb. Literatuur, blz. 506-507.
[In Dutch, with title and summary in English:— 'Notes on the parasites of Hidari irava in relation to the ecology of this pest'].

MORENO MÁRQUEZ, Victor. Los cebos envenenados contra la langosta. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.°s 31, 32, 33 y 34, págs. 49 a 56.

MÜLLER-STOLL, Wolfgang R. Studien über Hitzebeschädigungen an Weintrauben. *Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz*, Stuttgart 1939, 48. Bd., Heft 12, S. [577]-589, Abb. 1-6. Schriftenverzeichnis, S. 589.

MUSKETT, A. E. Biological technique for the evaluation of fungicides. *Agricultural Progress*, Shrewsbury, 1939, Vol. XVI, Pt. II, pp. 212-217. References, p. 217.

NATRASS, R. M. A new species of *Phleospora* on *Dodonaea viscosa* L. in Cyprus. *Transactions British Mycological Society*, London, 1939, Vol. XXIII, Pt. III, pp. 269-270, pl. VIII.
[*Phleospora dodonaeae* n. sp. Latin diagnosis].

NEWTON, Margaret, and JOHNSON, Thorvaldur. A mutation for pathogenicity in *Puccinia graminis Tritici*. *Canadian Journal of Research*, Ottawa, 1939, Vol. 17, Sec. C, No. 9, pp. [297]-299. References, p. 299.

NICOLAS, G[ustave], et AGGÉRY, [Berthe]. Sur la dessiccation hivernale d'origine bactérienne des feuilles de quelques plantes. *Revue Horticole*, Paris, 1939, 111^e année, n. sér., tome XXVI, n° 23, p. 551-554.
[Coccus].

NONELL COMAS, Jaime. Introducción y difusión del *Aphelinus mali* (Hald.) en España. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n°s 31, 32, 33 y 34, págs. 179 a 186.

OSTERWALDER, A. Kritische Betrachtungen zum Inkubationskalender für die *Pero-nospora*. *Schweizerische Zeitschrift für Obst-und Weinbau*, Wädenswil 1940, 49. Jahrg., Nr. 1, S. 3-9, Abb. 1-2.
[*Plasmopara viticola*].

- OULTON, J. T. Vermin on farms. Some suggested methods of destruction. *The East African Agricultural Journal of Kenya, Tanganyika, Uganda and Zanzibar*, Amani, 1939, Vol. 5, No. 3, pp. 225-229.
- OVERHOLTS, L. O. Geographical distribution of some American Polyporaceae. *Mycologia*, Lancaster, Pa., 1939, Vol. XXXI, No. 6, pp. 629-652, figs. 1-30.
- PADY, S. M. Host invasion in systemic infection of *Uromyces caladii*. *Mycologia*, Lancaster, Pa., 1939, Vol. XXXI, No. 5, pp. 590-605, figs. 1-3. Literature cited, pp. 604-605.
[*Uromyces caladii* on *Arisaema triphyllum*].
- PARISI, E[rmesto]. A proposito di parassiti del sorgo. *L'Industria Saccarifera Italiana*, Genova, 1940, anno XXXIII, n. 5, pp. 168-170, 3 figg.
- PARSONS, F. S. Investigations on the cotton bollworm, *Heliothis armigera*, Hubn. (obsolete, Fabr.). Part I. -- The annual march of bollworm incidence and related factors. *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 321-338, figs. 1-5, pl. X. References, p. 337.
- PERKINS, J. F. The *Ephialtes* (Hym. Ichm.) parasitising the codling moth. *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 307-308, figs. 1-4. *E. caudata* and *E. crassisetia* as parasites of *Cydia pomonella*].
- PETRI, L[ionello]. Recenti ricerche sul "mal secco" degli agrumi in Turchia. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. [81]-98.
Refers to the work of G. Gassner (see this *Bulletin*, 1940, Nos. 7-8, p. 151). The main results of the experiments carried out by Petri in Italy agree with those obtained by Gassner in Turkey as regards the infective and contagious nature of the disease. Petri, however, states that *Deuterophoma tracheiphila* (considered by him as the causal agent of 'mal secco' of citrus), is not identical with *Phoma limoni* Thümen. Neither in Sicily nor in Calabria did the damage caused by cold appear to promote infection, as Gassner asserted was the case in Turkey].
- PICKLES, Alan. A home-made Bordeaux-oil emulsion. *Proceedings of the Agricultural Society of Trinidad & Tobago*, Port-of-Spain, 1939, Vol. XXXIX, Pt. 4, pp. 115-116.
- PLANES GARCÍA, Silverio. La tensión superficial de las emulsiones en relación con su eficacia insecticida. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, nos 31, 32, 33 y 34, págs 187 a 196, figs. 1-7. Bibliografía, págs. 195 y 196.
- POPOV, P. V. The chemical composition and toxicity of solutions of polysulphides of barium. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 13, pp. 19-[25]. [Bibliography], p. [25].
In Russian, with title also in English].
- PROVAGLIO, G. L'esca per combattere le grillotalpe. *Bullettino dell'Agricoltura*, Milano, 1940, anno 74º, nn. 33-34, p. [1].
In this respect, see the previous article by the same author and those of E. Malenotti (*Bulletin*, 1940, No. 9, p. 176, No. 10, p. 202 and No. 12, p. 248)].
- RAMIREZ, Innocencio. *Schizophyllum commune* Fr. — a forest-products-rotting fungus. *The Philippine Journal of Forestry*, Manila, 1939, Vol. 2, No. 2, pp. 121-143, pls. 1-2. References, p. 141.
- RAO, Y. Ramchandra, and GUPTA, R. I. Some notes on eye-stripes in Acrididae. *The Indian Journal of Agricultural Science*, New Delhi, 1939, Vol. IX, Pt. V, pp. 727-729. References, p. 729.

- REINIGER, G. H., e GOMES, Jalmírez G. Do emprego de fungicidas com relação ao ataque de coccídeos e acaros nos laranjais. *O Campo*, Rio de Janeiro, 1939, ano 10, n.º 116, págs. 27-29, figs. 1-7. Bibliografía consultada, pag. 29.
- ROADS, Arthur S. The cause and control of melanose. *The Citrus Industry*, Bartow, Florida, 1940, Vol. 21, No. 6, pp. 5, 9 and 12, figs. 1-6.
[*Phomopsis citri*].
- RODRÍGUEZ CASALS, Carlos. Las grandes auxiliares del agricultor. Las arañas. *Revista de Agricultura*, San José, Costa Rica, 1939, año XI, no. 8, págs. 357 a 361, fig.
- RODRÍGUEZ SARDIÑA, Juan. La "grasa" de las judías (debida a *Bacterium medicaginis* var. *phaseolicola*) en España. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 231 a 264, figs. 1-12. Bibliografía, págs. 262 a 264.
[With summaries in Spanish, German and English].
- RUGGIERI, Gaetano]. Il manifestarsi in natura delle infezioni di "mal secco" attraverso i "verdelli" primaverili. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 150-155, tav. VIII.
[*Deuterophoma tracheiphila*].
- RUÍZ CASTRO, Aurelio, y MENDIZÁBAL, Manuel. La «roya colorada», producida por *Empoasca libyca* de Bergevin (Hem. Hom.), en los parrales de Almería. *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 150 a 161, figs. 1-9. Bibliografía, págs. 160 y 161.
- RUÍZ CASTRO, Aurelio. Experiencias de lucha contra el «melazo» de la parra (*Pseudococcus citri* Risso). *Boletín de Patología Vegetal y Entomología Agrícola*, Madrid, 1939, vol. VIII-1936, n.ºs 31, 32, 33 y 34, págs. 162 a 170. Bibliografía, págs. 169 y 170.
- SALAMAN, Redcliffe N., [and] WORTLEY, W. R. S. Potential hosts of potato viruses in garden and field. *Nature*, London, 1939, Vol. 144, No. 3660, pp. 1049-1050.
- SCHREFFER, E. Selbsthergestelltes Giftgetreide zur Mäusebekämpfung. *Deutsche Landwirtschaftliche Presse*, Berlin 1939, 66. Jahrg., Nr. 39, S. 473, Abb. 591-592.
- SCHULTHEISS, Fritz. Zur Bekämpfung des Kartoffelkäfers. *Deutsche Landwirtschaftliche Presse*, Berlin 1940, 67. Jahrg., Nr. 34, S. 311, Abb. 436.
[*Leptinotarsa decemlineata*].
- SCHULTZ, H. Blattschäden an Spinat durch *Colletotrichum spinaciae* Ell. et Halst. *Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten*, II. Abt., Jena 1939, 101. Bd., Nr. 9/13, S. 225-232, Abb. 1-7. Literaturübersicht, S. 232.
- SEMENOV, A. E. The big white winged cicada, *Tibicina zeyara* V. Kuzn., as a pest of arid agriculture. *Proceedings of the Lenin Academy of Agricultural Sciences of U. S. S. R.*, Moscow, 1940, issue 10, pp. 19-[23], figs. 1-3. [Bibliography], p. [23].
[In Russian, with title also in English].
- SIBILIA, Cesare. Alcune razze fisiologiche di "Puccinia graminis tritici" Erikss. et Henn. nell'Africa orientale italiana. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 115-118.
- SIBILIA, Cesare. L'*Ulmus pumila* e la grafiosi. *Bollettino della R. Stazione di Patologia Vegetale* [di Roma], Firenze, 1940, anno XX, n. ser., n. 2, pp. 147-149, 1 fig.
[*Graphium ulmi*].

- SIEGLER, E. A., and BOWMAN, J. J. Root responses of non-infectious hairy root apple seedlings under different methods of propagation. *Journal of Agricultural Research*, Washington, D. C., 1940, Vol. 60, No. 11, pp. 739-754, figs. 1-5. Literature cited, pp. 753-754.
- SMITH, J. H. Insects and their influence on agricultural development. *The Journal of the Australian Institute of Agricultural Science*, Sydney, 1939, Vol. 5, No. 3, pp. 148-153.
- SQUIRE, A. Observations on cotton stainers (*Dysdercus*) in the West Indies. *Bulletin of Entomological Research*, London, 1939, Vol. 30, Pt. 3, pp. 289-292, figs. 1-3. References, p. 292.
[*D. andreae*, *D. delauneyi*, *D. fernaldi*, *D. urichi*, *D. howardi*, *D. howardi* var. *minor*].

CONTENTS

| | PAGE |
|--|-------|
| INDEX TO THE MONTHLY BULLETIN OF AGRICULTURAL ECONOMICS AND SOCIOLOGY | V |
| INDEX TO THE MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS | IX |
| INDEX TO THE MONTHLY BULLETIN OF AGRICULTURAL SCIENCE AND PRACTICE | XV |
| INDEX TO THE INTERNATIONAL BULLETIN OF PLANT PROTECTION | XXIII |



INDEX OF THE 'MONTHLY BULLETIN OF AGRICULTURAL ECONOMICS AND SOCIOLOGY' FOR THE YEAR 1940

I. — Articles.

| | PAGE |
|---|-------|
| ARCOLEO, F.: The international regulation of the tea market since 1936 . . . | 21-E |
| ARCOLEO, F.: Crop insurance | 271-E |
| <i>Concluding note</i> | 306-E |
| BENA, H.: The progress of oil cultivation and manufacture in Tunisia . . | 147-E |
| COSTANZO, G.: Agricultural credit: its organization and new tendencies: Germany | 213-E |
| DESLARZES, J.: Changes in the profitability of agriculture in Indiana, Michigan and Illinois from 1932 to 1937 | 101-E |
| DESLARZES, J.: Changes in the profitability of agriculture in some European countries in 1935-36 and 1936-37 | 249-E |
| <i>Concluding note</i> | 293-E |
| FROMONT, P.: The consequences of motorization in farming | 41-E |
| LICHNOWSKY, L.: Land system in China | 1-E |
| LUGARI, M.: Some remarks on the agricultural organization of the tropical countries of the Andes | 89-E |
| <i>Concluding note</i> | 133-E |
| PAVLOVSKY, G.: The course of agricultural prices and costs in 1938-39 . | 173-E |
| POMENOW, K.: Exports of agricultural products from Bulgaria | 50-E |
| TCHERKINSKY, M.: Recent changes in the European land systems and their economic and social consequences | 325-E |
| <i>Continuation</i> | 355-E |
| <i>Continuation</i> | 387-E |
| ZLAMAL, J.: Some observations concerning the statistics of the production and consumption of Fodder | 375-E |

II. — International Chronicle of Agriculture.

| | PAGE |
|--|-------|
| AUSTRALIA: General situation — External trade — Measures relating to the production and marketing of agricultural products (dairy produce, wheat, fruit, wool, meat, other products, State marketing, cane-sugar, Soil Conservation); by F. G. Wigglesworth | 115-E |

| | PAGE |
|---|-------|
| BELGIUM: General situation - External trade (development of external trade, regulation of external trade) - Measures relating to the marketing of agricultural products (National Marketing Office for Agricultural and Horticultural Produce, The Supplies Department) - Measures relating to agricultural production (cereals, dairy produce); by <i>G. Costanzo</i> | 195-E |
| BRAZIL: General situation - Foreign trade (trade agreements) - Measures relating to marketing of agricultural products (coffee, cotton, sugar, oranges, maté, meat, tea) - Migration; by <i>G. A. Gehlsen</i> | 283-E |
| BULGARIA: General situation - Trade policy - Measures relating to the marketing of agricultural products - Measures relating to agricultural production - Work of public and private agricultural organizations - Agricultural co-operation - Agricultural credit - Agricultural insurance - Social policy; by <i>Th. Bakardjieff</i> | 276-E |
| GERMANY: Measures relating to agricultural production (land improvements, consolidation of parcelled lands) - Land system (distribution of agricultural and forest properties, peasant settlement); by <i>H. Böker</i> | 66-E |
| IRELAND: General situation - External trade (development, import restrictions, export regulations, export subsidies) - Measures relating to the marketing of agricultural products (cereals, flax, sugar-beet, tobacco, milk, dairy produce, pigs and bacon, eggs) - Measures relating to agricultural production (compulsory increase of tillage, loans for implements, fertilizer schemes); by <i>C. Perring</i> | 27-E |
| ITALY: General situation - External trade (development of external trade, regulation of external trade, trade treaties and agreements) - Measures relating to the marketing of agricultural products (maize, rice and olive oil pools) - Land system (settlement of the Sicilian latifundia); by <i>G. Costanzo</i> | 76-E |
| ITALY: General situation - Policy affecting agricultural production and marketing (Pooling of agricultural products, cereal market, subsidies for the construction of silos and warehouses for cereals and other agricultural products, cattle market, textile market, regulation of supply and demand, new irrigation schemes); by <i>G. Costanzo</i> | 317-E |
| LITHUANIA: External trade - Measures relating to agricultural marketing and production (market control, reduction of production costs, stimulation of agricultural production, increased production of selected seeds and seed control, progress of sugar-beet cultivation, increased productivity of marshy areas and grazing lands, encouragement of stock-breeding and the dairy industry, land drainage, land consolidation) - Agricultural credit - Social policy; by <i>I. Robinzonas</i> | 230-E |
| MEXICO: The economic and commercial situation on the eve of the war and after the outbreak of hostilities - Structure of foreign trade - Policy adopted as regards agricultural production (natural basis of agricultural production, production trends, vegetal products, cereals, dried kidney beans, chickpeas, vegetables, potatoes, fruit, sugar, vanilla, coffee, cacao, tobacco), by <i>A. Lens</i> | 343-E |

NETHERLANDS (THE): General situation - External trade - Measures relating to marketing and production (marketing regulation, cereals, sugar-beet, potatoes, flax, hay and straw, stockraising, regulation of production, oats, flax, caraway, mustard, poppy and beetroot seed, onions, garden produce, poultry, land reclamation) - Drainage of the Zuiderzee - Work of public and private agricultural organizations; by *J. P. van Aartsen* 153-E

NETHERLANDS INDIES: General situation - External trade - Measures relating to the marketing of agricultural products - Measures relating to agricultural production - Land system (internal settlement) - Work of public and private agricultural organizations - Agricultural co-operation - Agricultural credit - Farm labour; by *D. J. Hulshoff Pol.* 70-E

NORWAY: General situation - Measures relating to the marketing of agricultural products (cereals, milk and dairy produce market, pig meat and mutton market, eggs, levy on the purchase of concentrated feed, regulation of the manufacture and marketing of potato meal) - Agricultural credit; by *H. Lindstedt* 35-E

PERU: General situation - Foreign trade - Measures relating to agricultural production (natural conditions of agricultural production, orientation of production, vegetal products, cereals, sugar, fruits and vegetables, wine, olives, coffee, tea, cacao, coca, tobacco, cotton, flax, forest products, cinchona-bark, animal products, live stock, meat, hides and skins, wool, fish, general measures for promoting agricultural production, irrigation, legislative provisions concerning the production of foodstuffs, provision of guano); by *A. Lenz* 234-E

ROMANIA: General situation - External trade (development, regulation of foreign trade, treaties and trade agreements) - Measures relating to the marketing of agricultural products (wheat, tobacco, sugar-beet) - Measures relating to agricultural production (general measures for the encouragement of agricultural production) - Land tenure system - Work of public and private agricultural organizations; by *Gh. St. Ciulei.* 202-E

SWEDEN: General situation - Measures relating to the marketing of agricultural products (breadmaking cereals, fodder, sugar and sugar-beets, potatoes, cultivation of oleaginous plants, milk and edible fats market, meat and eggs) - land system (new legislation concerning State aid for the establishment of small agricultural holdings and detached dwellings in rural districts) - Agricultural credit (Loans granted for the conclusions of agreements and assistance loans) - Agricultural Labour (labour blocks, temporary abrogation of the law on working hours in agriculture); by *H. Lindstedt* 411-E

SWITZERLAND: General situation - External trade (exports of dairy produce, livestock exports, import and export control, import permits, sales taxes and supplementary duties) - Measures relating to the marketing of agricultural products (sale of livestock, milk prices, milling, purchase and sale of bread flour, fruit trade, potato trade, regulation of the sale of foodstuffs, regulation of prices, provisioning of the country with

indispensable goods) – Measures relating to agricultural production (increase in pig population, utilization of land) – Social policy (Workers' allowances); by *J. Deslarzes* 124-E

URUGUAY: General situation – External trade (encouragement of imports, levy of an excess profits tax, exports of the principal products, wool, skins and hides, meat, wheat and linseed, trade negotiations with the United States of America) – Measures relating to the marketing of agricultural products – Land tenure system (protection of tenant farms, homestead law, land settlement Commission) – Agricultural credit – Agricultural insurance – Social policy; by *A. Lenz* 161-E

Page numbers of the different issues.

| | | | |
|----------------------------|-------------------|---|----------------------|
| January (No. 1) | pages 1-E to 40-E | July & August (Nos. 7 & 8) | pages 249-E to 292-E |
| February (No. 2) | „ 41-E „ 84-E | September (No. 9) | „ 293-E „ 324-E |
| March (No. 3) | „ 89-E „ 132-E | October (No. 10) | „ 325-E „ 354-E |
| April (No. 4) | „ 133-E „ 172-E | November (No. 11) | „ 355-E „ 386-E |
| May No. 5) | „ 173-E „ 212-E | December (No. 12) | „ 387-E „ 422-E |
| June (No. 6) | „ 213-E „ 248-E | | |

INDEX TO THE 'MONTHLY CROP REPORT AND AGRICULTURAL STATISTICS' FOR THE YEAR 1940

I. — Vegetal Production.

1. CEREALS.

(Wheat, Rye, Barley, Oats, Meslin).

International articles and summaries.

World Wheat Production and Trade, I, 1-S. — World Wheat Production and Trade in 1939-40, II, 85-S. — World Wheat Supplies and Requirements, III, 165-S. — The World Trade in 1939-40 and the Condition of the standing Crops, IV, 265-S. — The Condition of the standing Crops, V, 325-S. — Wheat Crop Prospects, VI, 393-S. — The Prospects of the 1940 Wheat Crop VII, 449-S. — The Wheat Crop in 1940, VIII, 485-S. — The Wheat Crop in 1940, IX, 553-S. — World Wheat Production and Supplies in 1940-41 X, 611-S. — World Wheat Production in 1940, XI, 659-S. — The 1940 World Wheat Crop and the condition of Land under Wheat for the 1941 Harvest, XII, 714-S.

Monthly information concerning various countries.

I: 5-S. — II: 89-S. — III: 181-S; 231-S. — IV: 270-S. — V: 327-S; 392-S. — VI: 397-S. — VII: 452-S. — VIII: 489-S. — IX: 557-S. — X: 615-S; 657-S. — XI: 663-S. — XII: 719-S; 749-S.

International tables.

Wheat: I, 6-S; 7-S. — II, 90-S; 91-S. — III, 181-S; 182-S. — IV, 272-S; 288-S; 290-S. — V, 328-S. — VI, 398-S. — VII, 450-S. 455-S. — VIII, 487-S; 491-S. — IX, 554-S; 558-S. — X, 616-S; 618-S. — XI, 664-S; 666-S. — XII, 720-S; 722-S.

Rye: I, 6-S; 8-S. — II, 90-S; 92-S. — III, 181-S; 183-S. — IV, 272-S; 288-S; 290-S. — V, 328-S. — VII, 450-S; 455-S. — VIII, 487-S; 491-S. — IX, 554-S; 558-S. — X, 616-S; 618-S. — XI, 664-S. — 666-S. — XII, 720-S; 722-S.

Barley: I, 10-S. — II, 95-S. — III, 181-S; 185-S. — IV, 272-S; 288-S; 290-S. — V, 328-S. — VI, 398-S. — VII, 450-S; 455-S. — VIII, 487-S; 491-S. — IX, 554-S 558-S. — X, 616-S; 618-S. — XI, 664-S. — 666-S; — XII, 720-S; 722-S.

Oats: I, 11-S. — II, 96-S. — III, 181-S; 186-S. — IV, 272-S; 288-S; 290-S. — V, 328-S. — VI, 398-S. — VII, 450-S. 455-S. — VIII, 487-S; 491-S. — IX, 554-S. 558-S. — X, 616-S; 618-S. — XI, 664-S. 665-S; — XII, 720-S; 723-S.

Meslin: I, 9-S. — II, 93-S. — III, 184-S. — IV, 288-S.

2. MAIZE.

International articles and summaries.

Maize Production in the Northern Hemisphere, X, 619-S.

Monthly information concerning various countries.

I: 12-S. — II: 98-S. — III: 189-S. — IV: 275-S. — V: 331-S; 392-S. — VI: 403-S. — VII: 459-S. — VIII: 495-S. — IX: 562-S. — X: 622-S. 657-S. — XI: 669-S. — XII: 724-S.

International tables.

I: 13-S. — II: 99-S. — III: 190-S. — IV: 276-S. — 290-S. — XI: 669-S. — XII: 725-S.

3. RICE.

International articles and summaries.

Rice Production and Trade in the Far East, I, 14-S. - Rice Production and Trade in Monson Asia, III, 191-S.

Monthly information concerning various countries.

I: 17-S. - II: 100-S. - III: 195-S. - IV: 278-S. - V: 332-S.; 392-S. - VI: 404-S. - VII: 460-S. - VIII: 497-S. - IX: 563-S. - X: 623-S. - XI: 670-S. - XII: 725-S.

International tables.

I: 18-S. - II: 100-S. - III: 195-S. - IV: 288-S; 290-S.

4. POTATOES.

International articles and summaries.

Potatoes X, 624-S.

Monthly information concerning various countries.

I: 18-S. - II: 102-S. - III: 196-S. - IV: 279-S. - V: 332-S; 392-S. - VI: 405-S. - VII: 460-S. - VIII: 497-S. - IX: 564-S. - 624-S.; 657-S. - XI: 670-S. - XII: 726-S.

International tables.

I: 19-S. - II: 102-S. - III: 196-S. - IV: 288-S; 290-S. - XI: 671-S. - XII: 726-S.

5. SUGAR.

International articles and summaries.

Sugar Prices and Market Prospects, I, 20-S. - Production of Cane-Sugar in 1939-40, II, 103-S. - The Beet Areas in 1940, III, 197-S. - The Beet Areas in 1940, IV, 280-S. - The Beet Areas in 1940, V, 333-S. - General Review of the Sugar-Beet Crop and Sugar

Production, VI, 406-S. - The Sugar-Beet Crop in Europe and Sugar Production, VII, 461-S. - The Sugar Season in Europe, VIII, 498-S. - The Sugar Season in Europe, IX, 565-S. - The Production of Beet Sugar in 1940-41, X, 626-S. - Sugar Season, XI, 671-S. - Sugar Season, XII, 727-S.

Monthly information concerning various countries.

I: 27-S. - II: 104-S. - III: 197-S; 231-S. - IV: 281-S. - V: 334-S; 392-S. - VI: 408-S. - VII: 464-S. - VIII: 499-S. - IX: 566-S. - X: 628-S; 657-S. - XI: 672-S. - XII: 728-S.

International tables.

I: 26-S; 28-S. - II: 103-S; 104-S; 105-S. - III: 198-S; 199-S; 200-S. - IV: 281-S; 288-S; 290-S. - V: 383-S; 335-S. - VI: 406-S; 407-S. - VII: 462-S; 463-S. - VIII: 500-S; 501-S. - IX: 565-S; 568-S. - X: 626-S; 627-S; 629-S. - XI: 672-S; 674-S. - XII: 727-S; 728-S.

6. VINES.

International articles and summaries.

Wine Production in 1940, XI, 675-S.

Monthly information concerning various countries.

I: 29-S. - II: 106-S. - III: 201-S. - IV: 282-S. - V: 336-S; 392-S. - VI: 409-S. - VII: 465-S. - VIII: 502-S. - IX: 569-S. - X: 630-S. - XI: 676-S. - XII: 729-S.

International tables.

IV: 288-S.

7. OLIVES.

International articles and summaries.

World Production of Olive-Oil in the 1939-40 Season, I, 29-S.

*Monthly information
concerning various countries.*

III: 201-S. - IV: 283-S. - V: 336-S;
392-S. - VII: 465-S. - VIII: 503-S. -
IX: 570-S. - X: 631-S. - XI: 676-S. -
XII: 729-S.

International tables.

IV: 288-S; 290-S.

8. FLAX.

International articles and summaries.

World Linseed Production in 1939-40,
II, 106-S. - Preliminary Results and
Estimates of the World Linseed Crop
in 1940-41, X, 632-S. The World
Statistical Situation of Linseed, Lin-
seed Oil and Linseed Oil Substitutes,
XII, 730-S.

*Monthly information
concerning various countries.*

I: 32-S. - II: 109-S. - III: 201-S. - IV:
283-S. - V: 336-S; 392-S. - VI: 410-S.
- VII: 466-S. - VIII: 503-S. - IX:
570-S. - X: 638-S. - XI: 677-S.

International tables.

I: 33-S. - II: 107-S. - III: 202-S. - IV:
290-S. - VIII: 504-S. - IX: 571-S. -
X: 633-S. - XI: 677-S. - XII: 731-S.

9. COTTON.

*Monthly information
concerning various countries.*

I: 34-S. - II: 109-S. - III: 203-S. - IV:
284-S. - V: 337-S. 392-S. - VI: 411-S.
- VII: 467-S. - VIII: 504-S. 552-S
- IX: 572-S. - X: 638-S. - XI: 678-S.
- XII: 743-S.

International tables.

I: 34-S. - II: 110-S. - III: 205-S. - IV:
288-S; 290-S.

10. HEMP.

*Monthly information
concerning various countries.*

I: 36-S. - III: 206-S. - IV: 286-S. - V:
338-S; 392-S. - VI: 417-S. - VII:
468-S; - VIII- 506-S. - IX: 574-S. -
X: 640-S. - XI: 679-S. - XII: 745-S.

International tables.

I: 36-S. - II: 111-S. - III: 207-S.

11. TOBACCO.

International articles and summaries.

World Tobacco Production, III, 207-S.

*Monthly information
concerning various countries.*

I: 37-S. - II: 112-S. - IV: 286-S; 288-S;
290-S. - V: 338-S; 392-S. - VI: 417-S.
- VII: 468-S. - VIII: 506-S. - IX:
574-S. - X: 640-S. - XI: 679-S. - XII:
746-S.

International tables.

I: 378-S. - II: 112-S.

12. HOPS.

*Monthly information
concerning various countries.*

I: 38-S. - III: 214-S. - IV: 286. - VI:
417-S. - VII: 469-S. - VIII: 507-S. -
IX: 575-S. - X: 641-S. - XI: 680-S.

International tables.

I: 38-S. - III: 214-S.

13. CACAO.

*Monthly information
concerning various countries.*

I: 38-S. - II: 113-S. - III: 215-S. - IV:
287-S. - V: 339-S. - VI: 417-S. - VII:
469-S. - VIII: 507-S.

14. TEA.

*Monthly information
concerning various countries.*

I: 40-S; - II: 113-S. - III: 216-S. - IV:
287-S. - V: 340-S. - VI: 419-S. - XI:
689-S.

15. COFFEE.

International articles and summaries.

World Statistical Situation of Coffee,
V, 340-S.

*Monthly information
concerning various countries.*

I: 40-S. - II: 114-S. - III: 216-S. - IV:
287-S. - VI: 420-S. - VIII: 508-S. -
IX: 575-S. - X: 641-S. - XI: 680-S. -
XII: 746-S.

16. GROUNDNUTS.

*Monthly information
concerning various countries.*

I: 41-S. - II: 114-S. - III: 217-S. -
IV: 287-S. - V: 357-S. - VI: 420-S. -
VII: 470-S. - IX: 575-S. - X: 641-S.
- XI: 680-S. - XII: 746-S.

17. COLZA AND SESAME.

*Monthly information
concerning various countries.*

I: 41-S. - II: 114-S. - III: 218-S. - IV:
287-S; 289-S. - V: 357-S; 392-S. - VI:

421-S. - VII: 470-S. - VIII: 509-S. -
575-S. - X: 641-S. - XI: 680-S. - XII:
746-S.

18. SOYA.

*Monthly information
concerning various countries.*

VI: 421-S. - IX: 575-S. - XI: 680-S. -
XII: 746-S.

19. SUNFLOWERS.

*Monthly information
concerning various countries.*

III: 218-S. - XII: 747-S.

20. JUTE.

*Monthly information
concerning various countries.*

VI: 421-S.

21. FODDER CROPS.

*Monthly information
concerning various countries.*

I: 42-S. - II: 115-S. - III: 219-S. - IV:
291-S. - V: 357-S; 392-S. - VI: 422-S.
- VII: 470-S. - VIII: 509-S. - XI:
576-S. - X: 642-S. - XI: 681-S. - XII:
747-S.

II. — Livestock and Derivatives.

I. INTERNATIONAL ARTICLES AND SUMMARIES.

Milk: General Review of the Production
and International Trade of Preserved
Milk, VI, 424-S.

Butter: Butter Production, Trade and
Prices in 1939, IV, 295-S.

Cheese: Cheese Production and Marke-
ting in 1939, V, 361-S.

Casein: World Casein Production and
Trade, III, 224-S.

Eggs: World Trade in Eggs in the last
ten years, VIII, 517-S.

Honey: World Production and Trade of
Honey and Beeswax, IX, 578-S.

Silk: The World Silk Situation, XI,
682-S.

2. TABLES AND INFORMATION
CONCERNING VARIOUS COUNTRIES

Australia: I, 49-S.
Belgium: IV, 292-S.
Bulgaria: VI, 423-S.
Canada: I, 44-S. - IV, 293-S; 295-S.
Chile: XI, 682-S.
Denmark: II, 115-S. - III, 220-S. - V,
358-S. - VIII, 511-S. - IX, 578-S. -
X, 643-S. - 644-S. - XII, 747-S.
Estonia: II, 220-S.
Germany: III, 219-S.
Greece: VI, 424-S.
Hungary: VIII, 512-S.
Japan: V, 360-S.
Lithuania: VIII, 513-S.
Luxemburg: III, 221-S.
Netherlands: II, 116-S.
Switzerland: II, 116-S; 118-S. - III, 221-S.
- VIII, 513-S; 516-S.

Rumania: IV, 293-S.
United States: I, 47-S. - III, 223-S.
- IV, 295-S.
U. S. S. R.: II, 119-S.
Yugoslavia: V, 359-S; 360-S.

3. MONTHLY INFORMATIONS.

Livestock and animal products.

I: 50-S. - II: 120-S. - III: 231-S. - IV:
304-S. - V: 370-S. - VI: 432-S. - VIII:
539-S. - IX: 592-S. - X: 644-S. - XI:
682-S. - XII: 748-S.

Sericulture.

I: 50-S. - II: 121-S. - IV: 304-S. - V:
371-S. - VI: 433-S. - VII: 472-S. -
VIII: 539-S. - IX: 593-S. - X: 645-S.
- XII: 748-S.

III. — Trade and Stocks.

*International articles
and summaries.*

International Trade in some important
Agricultural Products since the begin-
ning of the War, III, 232-S.

I: 51-S. - II: 122-S. - III: 243-S. - IV:
305-S. - V: 372-S. - VI: 434-S. - VII:
473-S. - VIII: 540-S. - IX: 594-S.
- X: 646-S. - XI: 691-S. XII: 750-S.

2. STOCKS.

(Cereals, potatoes and cotton)

1. MONTHLY IMPORTS AND EXPORTS.

(Wheat, wheat flour, total wheat and
flour, rye, barley, oats, maize, rice,
linseed, cotton, wool, butter, cheese,
cacao, tea, coffee).

I: 67-S. - II: 138-S. - III: 251-S. - IV:
313-S. - V: 380-S. - VI: 442-S.; 448-S.
- VII: 477-S. - VIII: 544-S. - IX:
598-S; 606-S. - X: 650-S. - XI: 695-S.
XII: 754-S.

IV. — Prices.

ARTICLES AND SUMMARIES.

Prices of Agricultural Products in Ger-
many, II, 142-S. - Fixed cereals prices
in Germany, VII, 478-S. - Prices for

cereal of the new Crop, IX, 600-S. -
Prices for cereals of the new Crop,
XI, 697-S. Prices for Cereals of the
new Crop, XII, 755-S.

1. WEEKLY PRICES BY PRODUCTS.

(Wheat, rye, barley, oats, maize, rice (milled), linseed, cottonseed, cotton, bacon, butter, cheese, eggs (fresh).

I: 69-S. - II: 148-S. - III: 253-S. - IV: 316-S. - V: 384-S. - VI: 444-S. - VII: 479-S. - VIII: 546-S. - IX: 603-S. - X: 652-S. - XI: 702-S. - XII: 756-S.

2. MONTHLY PRICES BY COUNTRIES.

I: 72-S. - IV: 256-S. - VI: 447-S. - VI: 482-S. - X: 655-S.

3. PRICES IN GOLD FRANCS.

I: 76-S. - II: 151-S. - III: 256-S.

4. INDEX NUMBERS OF PRICES.

I: 79-S. - II: 152-S. - III: 257-S. - V: 387-S. - VIII: 549-S. XII: 759-S.

V. — Appendix.

1. THE SECOND WORLD AGRICULTURAL CENSUS.

Agricultural Censuses taken in European Countries in 1939, II, 158-S. - The Agricultural Census in Germany, 1939, III, 262-S. - The Agricultural Census in the Netherlands, III, 264-S. - Census of Agricultural Holdings in Latvia in 1939, IV, 322-S. - The Census of Agricultural Holdings in Germany in

1939, IX, 607-S. - The general Agricultural Census in Norway in 1939, IX, 608-S. - The present condition of the second world Agricultural census, XII, 749-S. - The census of Agricultural Holdings in satvia in 1939, XII, 762-S.

2. OTHER ARTICLES AND SUMMARIES.

The Organization of Agricultural Statistics in Albania, II, 161-S.

INDEX TO THE 'MONTHLY BULLETIN OF AGRICULTURAL SCIENCE AND PRACTICE' FOR THE YEAR 1940

I. — Summary

A. — ORIGINAL ARTICLES

January

- A survey of films on agricultural subjects, GAUGAIN, S., 1-T.
The German horticultural exhibition Stuttgart, 1939, RUYS, J. D., 11-T.
Notes on the cultivation of cinchona and the world supply of quinine, KERBOSCH, M., 14-T.
New tendencies in rural building, HOPFEN, H. J., 24-T.

February

- Citrus growing in Algeria, PASCUAL, A., 41-T.
Organization of milk recording in different countries, 47-T.
Survey of the human nutrition problem under present conditions, GASSER, E., 53-T.
Synthetic rubber and its competition with the natural product, GEHLSSEN, C. A., 69-T.

March

- A survey of films on agricultural subjects, GAUGAIN, S., 89-T.
The organization and encouragement of horse breeding in Egypt, 94-T.
Organization of milk recording in different countries: Hungary, 95-T.
The manufacture of agricultural machinery and international trade from 1929 to 1938, HOPFEN, H. J., 98-T.

April

- Almond growing throughout the world, PASCUAL, A., 133-T.
Present-day problems in animal nutrition. Self-sufficiency in fodder supplies, MOSKOVITS, I., 149-T.
Bovine tuberculosis and brucellosis in Yugoslavia, RAJČEVIČ, M., 173-T.

May

- A survey of films on agricultural subjects, GAUGAIN, S., 185-T.
The forage problem in the Union of South Africa, LEGROS, J., 192-T.
Standardization of fruits and vegetables, KLOOT MEIJBURG, L. L. K. van der, 204-T.

June

- Mixed cultivation of cereals and legumes for grain, HANCK, A., 223-T.
The forage problem in the Union of South Africa, LEGROS, J., 231-T.
New methods of haymaking, HOPFEN, H. J., 239-T.

July-August

- Agricultural libraries, FRAUENDORFER, S. V., 255-T.
The forage problem in the Union of South Africa, LEGROS, J., 264-T.
Adoption of new technical methods in wall construction for rural buildings, HOPFEN, H. J., 273-T.
The problem of the quality of bread, LELESZ, E., 276-T.

September

- Different aspects of soil conservation.
Possibilities of international collaboration, BALLY, W., 295-T.
Problem of malnutrition as regards the rural populations of Europe, LELESZ, E., 310-T.
Organization of milk recording in Lithuania, 316-T.

October

- Sorgo, HANCK, A., 331-T.
Forage problem in the Union of South Africa, LEGROS J., 340-T.
Problem of malnutrition as regards the rural population of Europe, LELESZ, E., 355-T.

November

- New aspects, theoretical and practical, of forage ensilage, ARNAUDI C. 371-T.
Sorgo, HANCK, A., 382-T.
New aspects on the drying and disinfection of cereals, GASSER, E., and G. STAMPA, 391-T.

December

- Sorgo, HANCK, A., 407-T.
Citrus in Morocco and Tunisia, PASCUAL, A., 425-T.
Organization of milk recording in Japan, GAUTHIER-CLERC, S., 432-T.

B. — MISCELLANEOUS INFORMATION

January

- International agreements for the establishment of international genetic symbols, 29-T.
The increase of soya-bean cultivation in south-east Europe, 29-T.
The industrial use of *Anabasis aphylla* L., 30-T.
Measures concerning the use of milking machines in Germany, 31-T.
Care of pneumatic tyres, 31-T.

- Competition for the preparation of a drink prepared from grape juice or wine, 33-T.
The value of sugar in human nutrition, 33-T.
Yeast in human nutrition, 33-T.
Tuberculosis in the country, 34-T.

February

- The wheat problem in Venezuela, 79-T.
Research on the botany of the olive blossom, 80-T.
Tropical fruits, 80-T.
Nutritive and therapeutic value of olive oil, 81-T.
The cultivation of the chestnut, fig, hazelnut and walnut in Spain, 81-T.
The cultivation of the cork oak and the cork industry in Spain, 83-T.

March

- An organic fertilizer manufactured from town refuse, 118-T.
The aims of plant breeding in German agriculture, 119-T.
An interesting leguminous fodder plant in the Misiones region, Argentina, 123-T.
The cultivation of henna, 124-T.
The Institute for the examination and control of agricultural implements and machinery at Belgrade, Yugoslavia, 196-T.
VIth International Congress for agricultural industries, 127-T.

April

- Wheat breeding in Uruguay, 179-T.
The development of potato production in Germany, 180-T.
A jute substitute, 181-T.
The effect of weather on the fattening of pigs, 181-T.
Porous glass, a new building material, 181-T.
A scheme for a joint investigation on the preservation of foodstuffs by refrigeration and an atmosphere of carbon dioxide, 182-T.

The possibility of an industrial use for cherry stones and walnut shells, 183-T.
Autarchic nutrition in Italy, 183-T.

May

Potato haulms as a source of cellulose in Germany, 214-T.
The encouragement of horse breeding in Switzerland, 216-T.
The registration of Arab horses in Syria, 216-T.
Model fattening establishments in Hungary, 216-T.
The distillation industry in Uruguay, 217-T.

June

Alternate and spring wheats in Belgium, 243-T.
Colza and winter rape in Germany, 244-T.
Capsicum cultivation and industry in Spain, 245-T.
Development of fruit arboriculture in Bulgaria, 246-T.
Progress and encouragement of animal husbandry in Belgium, 247-T.
The use of horses and the mechanization of agriculture in Germany, 249-T.
Development of agricultural instruction in Hungary, 249-T.

July-August

Production of potatoes in the mountainous districts of France, 283-T.
Mulberry-growing in Indochina, 284-T.
Progress of poultry-farming in Hungary, 287-T.
Utilization of kitchen garbage for feeding pigs in Germany, 288-T.
Refrigerating car for the transport of hung beef (half-carcases), 288-T.
Control of fraudulency in the competition of margarine with butter, 288-T.

September

Agriculture in Argentina, 320-T.
Polymnia edulis, a forage plant used for the production of alcohol, 326-T.
Daily bread and the wheat embryo as a source of vitamin E., 328-T.

October

Possible application of vitamin B in horticulture, 367-T.
Present importance of sunflower cultivation in the Argentine Republic and its influence on the production of vegetable edible oils, 367-T.

November

Lonicera edulis as a fruit crop, 403-T.
Experiments on the fattening of late-season lambs on summer artificial meadows, 404-T.

December

International Institute of Agrostological Research, 435-T.
Use of fertilizers in the chief sugarcane regions, 435-T.
New tendencies in rural construction in Germany, 440-T.
Production and trade in agricultural machinery in the United States, in 1939, 441-T.
Machine for separating seed from not easily removable impurities, 443-T.
Elimination of diseased milch cows in Switzerland, 443-T.
A wax from hemp, 444-T.

C. — BOOK NOTICES.

January

An African Survey, LORD HAILEY, 36-T.
Science in Africa, WORTHINGTON, E. B., 38-T.

February

Le fumier artificiel en agriculture, en culture maraichère, LAFITE, CH., and J. CAUDRON, 84-T.
Flora privata di Capri, CERIO, E., 84-T.
Le olive da tavola, CANNATA, V., 85-T.
The Genetics of Cotton, HARLAND, SYDNEY CROSS, 85-T.
Rapport des essais de gazogènes 86-T.

March

Code de l'enseignement technique et de l'enseignement agricole, BANWENS, L., 128-T.

La difesa del suolo negli Stati Uniti di America, ALFANI, A., 129-T.

Rapport de la Commission des oliviers, sur l'olivier au Maroc, MENAGER, H., 129-T.

Principes de zoologie agricole, VAYSSIÈRE, P., 130-T.

April

Repertoire international de la presse agricole, 184-T.

Bibliografija slovenske, kmetijske literature v letih 1919-1938, SLEBINGER, JANKO, and JANEZ MARENTIĆ, 184-T.

May

An Empire in the Making, QUARANTA F., 221-T.

Zootecnia speciale degli animali domestici agricoli, BORGIOLI, E., 222-T.

June

Soil Analysis, WRIGHT, C. H., 250-T.

Gli attrezzi rurali e il lavoro agricolo nell'antichità, DEL PELO PARDI, G., 250-T.

Animal Breeding in the Light of Genetics, 251-T.

Die Ernährung des Waldes; Handbuch der Forstdüngung, BEKER-DILLINGEN, J., 251-T.

Den svenska lantbrukslitteraturen, HEBBE, P. M., 252-T.

July-August

Trattato di ecologia agraria, AZZI, G., 291-T.

Soil Conservation, BENNETT, HUGH HAMMOND, 292-T.

Turkiye bugdaylari, GÖKGÖL, MIRZA HACIZADE, 293-T.

September

Practical Food Inspection, MARTIN, C. R. A., 328-T.

October

Beiträge zur Agrargeographie der afrikanischen Trockengebiete, FALKNER, F. R., 368-T.

Die Keimpflanzenmethode, NEUBAUER, H., 369-T.

The Feeding of Farm Livestock, ELLIS, J. C. G., 369-T.

November

Enciclopedia delle piccole e medie industrie, CIANCIMINO, M., 427-T.

Schmelzkäseindustrie, KIEFERLE, F., and I. UMBRECHT, 405-T.

Deutsche Forschungsstätten im Dienste der Nahrungsfreiheit, 406-T.

December

Handbuch der Pflanzenzüchtung, ROEMER, TH., and W. RUDOLF, 444-T.

Field Trial, their Lay-out and Statistical Analysis, 445-T.

La canna comune, ONOFFY, A., 46-4 T.

Le irrigazioni nei riguardi tecnico-costruttivi, DI RICCO, G., 446-T.

Les parfums naturels, essences concrètes, résinoïdes, huiles et pommades, NAVES, Y. R., and MAZUYER, 447-T.

Butter, TOTMAN, C. C., G. L. MCKAY, and CH. LARSEN, 447-T.

Die Dokumentation in der Forstwirtschaft, GRÜNWOLDT, F., 448-T.

II. — Subject Index

A

ALCOHOL, 217-T, 326-T.
 Algeria: Citrus, 41-T.
 Almond, 133-T.
Anabasis aphylla, 30-T.
 Animal husbandry, 94-T, 149-T, 150-T,
 173-T, 181-T, 216-T, 222-T, 246-T,
 251-T, 287-T, 288-T, 370-T, 404-T,
 443-T.
 Argentina: Agriculture, 320-T; Legu-
 minous fodder plants in the Misiones
 region, 123-T; Sunflower cultivation,
 367-T.

B

BELGIUM: Animal husbandry, 247-T;
 Technical and agricultural education,
 128-T; Wheat, 243-T.
 Bibliography (agricultural), 184-T.
 Bovine tuberculosis, 173-T.
 Bread, 276-T, 328-T.
 Brucellosis, 173-T.
 Bulgaria: Fruit arboriculture, 246-T.
 Butter, 288-T, 447-T.

C

CANE, 446-T.
 Capsicum, 245-T.
 Cellulose, 214-T.
 Cereals, 223-T, 391-T.
 Cheese, 405-T.
 Cherry stones, 183-T.
 Chestnut, 81-T.
 Cinchona, 14-T.
 Citrus, 41-T, 425-T.
 Colonial agriculture, 36-T, 38-T.
 Colza, 244-T.
 Congresses: Vith International Congress
 for Agricultural Industries, (Buda-
 pest, 10-20 July, 1939), 127-T.
 Cork oaks, 83-T.
 Cotton, 85-T.

D

DISINFECTION, 391-T.
 Drying, 391-T.

E

ECOLOGY (AGRICULTURAL), 291-T.
 Education (agricultural), 128-T, 249-T.
 Egypt: Horse breeding, 94-T.
 Engineering (rural), 24-T, 31-T, 98-T,
 126-T, 181-T, 239-T, 250-T, 273-T,
 368-T.
 Ensilage, 371-T.
 Exhibitions: German Horticultural Exhi-
 bition, Stuttgart, 1939, 11-T.

F

FERTILIZERS, 118-T, 435-T.
 Fig, 81-T.
 Films (agricultural), 1-T, 89-T, 185-T.
 Flora, 84-T.
 Fodder supplies, 150-T.
 Food inspection, 328-T.
 Foodstuffs preservation, 182-T.
 Forages, 192-T, 231-T, 264-T, 326-T,
 340-T, 371-T.
 Forestry, 251-T, 448-T.
 France: Potatoes, 283-T.
 Fruits, 80-T, 204-T, 246-T.

G

GAS, 86-T.
 Genetic, 29-T.
 Germany: Colza and winter rape, 244-T;
 Experiment and research stations in
 Germany, 406-T; Horticultural exhi-
 bition, Stuttgart, 1939, 11-T; Mechan-
 ization, 249-T; Milking machines, 31-T;
 Pigs, 288-T; Plant breeding, 119-T;
 Potato halms as a source of cellulose,
 214-T; Potatoes, 180-T; Rural con-
 struction, 440-T.
 Glass (porous), 181-T.
 Grape juice, 33-T.

H

HAYMAKING, 239-T.
Hazelnut, 81-T.
Hemp, 444-T.
Henna, 124-T.
Horses, 94-T.
Horticulture, 11-T.
Hungary: Agricultural education, 249-T;
Vith International Congress for Agricultural Industries (Budapest, 10-20 July, 1939), 127-T; Milk recording, 95-T; Model fattening establishments, 216-T; Poultry-farming, 287-T.

I

INDOCHINA: Mulberry-growing, 284-T.
Industries (agricultural), 127-T, 405-T.
International Institute of Agrostological Research, 435-T.
Italy: Antarchic nutrition, 183-T.
Irrigation, 368-T, 446-T.

J

JAPAN: Milk recording, 432-T.
Jute substitute, 181-T.

L

LEGUMINOUS, 123-T, 223-T.
Libraries (agricultural), 255-T.
Lithuania: Milk recording, 316-T.
Lonicera edulis, 403-T.

M

MACHINERY (AGRICULTURAL), 98-T, 126-T, 441-T, 443-T.
Manure, 84-T.
Margarine, 288-T.
Milking machines, 31-T.
Milk recording, 47-T, 95-T, 316-T, 432-T.
Morocco: Citrus, 425-T; Oliviculture, 129-T.
Mulberry, 284-T.

N

NEW PERIODICALS RECEIVED BY THE
LIBRARY OF THE INTERNAL INSTITUTE
OF AGRICULTURE, 131-T, 252-T, 329-T, 449-T.
Nutrition (animal), 149-T, 288-T.
Nutrition (human), 33-T, 53-T, 183-T, 276-T, 310-T, 355-T.

O

OLIVICULTURE, 80-T, 84-T, 129-T.

P

PERFUME INDUSTRY, 447-T.
Plant improvement, 444-T.
Pneumatic tyres, 31-T.
Polymnia edulis, 326-T.
Potatoes, 180-T, 214-T, 283-T.
Poultry-farming, 287-T.
Press (agricultural), 184-T.

R

REFRIGERATION, 288-T.
Research institutions, 406-T.
Rubber (synthetic), 69-T.
Rural buildings, 24-T, 273-T, 440-T.

S

SOIL ANALYSIS, 250-T, 369-T.
Soil conservation, 292-T, 295-T.
Soil erosion, 129-T.
Sorgo, 331-T, 382-T, 407-T.
Soya, 29-T.
Spain: Capsicum cultivation and industry, 245-T; Cultivation of the chestnut, fig, hazelnut, and walnut in Spain, 81-T; Cultivation of the cork oak and the cork industry, 83-T.
Statistics (agricultural), 445-T.
Sugar, 33-T.
Sugarcane, 435-T.
Sunflower, 367-T.
Switzerland: Cow-breeding, 443-T; Horse breeding, 216-T.
Sweden: Agriculture, 252-T.
Syria: Registration of Arab horses, 216-T.

T

TUBERCULOSIS, IN THE COUNTRY, 34-T.
Tunisia: Citrus, 425-T.

U

UNION OF SOUTH AFRICA: Forage problem, 192-T, 231-T, 264-T, 340-T.
United States of America: Agricultural machinery, 441-T; Soil erosion, 129-T.
Uruguay: Distillation industry, 217-T; Wheat, 179-T.

V

VEGETABLES, 204-T.
Venezuela: Wheat, 79-T.
Vitamin E, 328-T.
Vitamin B, 367-T.

W

WALNUT, 81-T.
Walnut shells, 183-T.
Wheat, 79-T, 179-T, 243-T, 293-T, 328-T.
Winter rape, 244-T.

Y

YEAST, 33-T.
Yugoslavia: Bovine tuberculosis and brucellosis in Yugoslavia, 173-T; Institute for the examination and control of agricultural implements and machinery at Belgrade, 126-T.

Z

ZOOLOGY (AGRICULTURAL), 130-T.

III. — Index of Names

Alfani, A., 129-T.
Arnaudi, C., 381-T.
Azzi, G., 291-T.

Bally, W., 295-T.
Bauwens, L., 128-T.
Becker-Dillingen, J., 251-T.
Bennett, H. H., 392-T.
Borgioli, E., 222-T.

Cannata, U., 85-T.
Caudron, J., 84-T.
Cerio, E., 84-T.

Del Pelo Pardi, G., 250-T.
Di Ricco, G., 446-T.

Ellis, J. C. G., 369-T.

Falkner, F. R., 368-T.
Frauendorfer, S. v., 255-T.

Gasser, E., 53-T, 391-T.
Gaugain, S., 1-T, 89-T, 185-T.
Gauthier-Clerc, S., 432-T.

Gehlsen, C. A., 69-T.
Gökgöl, M. H., 293-T.
Grünwoldt, F., 448-T.

Hailey, 36-T.
Hanck, A., 223-T, 331-T, 382-T, 407-T.
Hebbe, P. M., 252-T.
Hopfen, H. J., 24-T, 98-T, 239-T, 273-T.

Kerbosch, M., 14-T.
Kieferle, F., 405-T.
Kloot Meijburg, L. L. K., van der, 204-T.

Lafite, Ch., 84-T.
Larsen, Ch., 447-T.
Legros, J., 192-T, 231-T, 264-T, 340-T.
Lelesz, E., 276-T, 310-T, 355-T.

Marentic, 184-T.
Martin, C. R. A., 328-T.
Mazuyer, 447-T.
Mckay, G. L., 447-T.
Menager, H., 129-T.
Moskovits, I., 149-T, 150-T.

Naves, Y. R., 447-T.
Neubauer, H., 369-T.

Onofry, A., 446-T.

Pascual, A., 41-T, 133-T, 425-T.

Quaranta, F., 221-T.

Rajčević, M., 173-T.

Roemer, Th., 444-T.

Rudorf, W., 444-T.

Ruys, J. D., 11-T.

Sydney Cross, H., 85-T.

Slebinger, J., 184-T.

Stampa, G., 391-T.

Totman, C. C., 447-T.

Umbrecht, I., 405-T.

Vayssière, P., 130-T.

Worthington, F. B., 38-T.

Wright, C. H., 250-T.

INDEX TO THE 'INTERNATIONAL BULLETIN OF PLANT PROTECTION' FOR THE YEAR 1940

I. — Subject Index.

A.

ARGENTINE REPUBLIC: *Coryneum carpophilum* on fruit trees, 99-M. — Decree No. 54,521 of February 3, 1940 relative to the 'Fábrica de insecticidas y fungicidas', 104-M. — Locusts, 73-M, 161-M. — 'Mancha bacteriana', of the tomato, 25-M.

Australia: Act No. 8 of October 12, 1939 which may be cited as The Pest Destroyers Act of 1939, consolidates and amends the Law relating to the regulation of the sale of insecticides, fungicides, vermin destroyers, hires, weed destroyers and sterilisers or cleansers, in Queensland, 56-M. — A. No. 19 of November 22, 1939 amending the Noxious Weed Act, 1931-1938, (South Australia), 124-M. — *Emex australis* (double gee) declared to be a noxious weed within the boundaries of the Bunbury Road Board, Western Australia, on October 27, 1939, 56-M. — Notes on plant diseases recorded in New South Wales during the year ending June 30, 1939, 99-M. — *Raphanus raphanistrum* (wild radish) an *Emex australis* (double gee), declared to be noxious weeds within the boundaries of the Mukinbudin Road Board and Preston Road Board districts Western Australia respectively, 10-M. — Regulation 51 of November 8, 1939 relative to the control of American maize smut (*Ustilago zaeae*), in New South Wales, 124-M. — *Senecio jacobaea* declared to be a noxious weed throughout Western Australia on January 30, 1940, 144-M. — *Tribulus terrestris* (caltrop) declared to be a noxious weed

within the boundaries of the Mukinbudin Road Board, Western Australia, 81-M.

B.

BAVARIA: Decree of July 25, 1940 relative to the control of sparrows, 239-M. — Notification of July 25, 1940 relative to the control of sparrows, 240-M.

Belgium: Ministerial Decree of February 9, 1940 relative to the control of potato wart disease (*Synchytrium endobioticum*), 81-M. — M. D. of April 15, 1940 relative to the sanitary inspection of plant products, 124-M.

Bibliography (Recent), 12-M, 37-M, 61-M, 85-M, 106-M, 126-M, 147-M, 168-M, 197-M, 216-M, 241-M. — (See also the special list of authors mentioned under the heading 'Recent Bibliography' of the *Bulletin*).

Bohemia and Moravia (Protectorate of): Decree No. 45 of February 24, 1939 relative to the control of Colorado beetle (*Leptinotarsa decemlineata*), 7-M. — D. No. 137 of April 28, 1939 relative to the destruction of *Berberis vulgaris* and *Mahonia* (B.) *Aquifolium*, 33-M. — D. No. 143 of May 19, 1939 relative to the destruction of wild hop vines (*Humulus lupulus*), 33-M. — D. No. 133 of February 22, 1940 relative to the control of the potato wart disease (*Synchytrium endobioticum*), 166-M. — D. of February 29, 1940 relative to the protection of fruits and vines, 214-M. — D. of June 6, 1940 relative to the control of animal pests, 214-M. — Notification of March 23, 1939 relative to the control of the Colorado

beetle (*L. decemlineata*), 9-M. - N. of May 19, 1939 relative to the control of San José scale (*Aspidiotus perniciosus*), 9-M. - Ordinance No. 186 of July 20, 1939 relative to hop downy mildew (*Pseudoperonospora humuli*), 34-M. - O. No. 205 of August 10, 1939, concerning hunters, 34-M. - O. No. 92 of February 8, 1940 relative to the destruction of weeds, 143-M. - Resolution of March 7, 1940 relative to the import of seeds and plants of forest species from abroad 144-M.

Brazil: Diseases of cultivated or useful plants observed in the State of São Paulo, 25-M.

Brunswick: Decree of September 9, 1939 relative to the protection of bees, 9-M.

Burma: Department Notification No. 376 of September 4, 1939 prohibiting absolutely the importation of gram (*Cicer arietinum*), 56-M. - New plant diseases recorded in 1939, 163-M.

C.

CANADA: Pest Control Products Act, 1939, relative to the control of agricultural pests, 10-M.

Channel Islands: Colorado beetle (*Leptinotarsa decemlineata*) outbreak in Jersey, 101-M.

Chile: Decree No. 629 of September 27, 1939 relative to the phytosanitary police, 35-M. - D. No. 698 of October 18, 1939 relative to the control of the causal agent of the 'arrebato' of cotton (*Dysdercus* sp.), 56-M.

Colombia: Decree No. 352 of February 1940 relative to the development of phytosanitary campaigns and to the functions of the Provident Section of the agricultural, industrial and mining Loan Bank, 169-M. - D. No. 438 of March 4, 1940 relative to the control of the Sigatoka disease of banana (*Cercospora musae*), 166-M.

Congresses: Thirteenth International Zoological Congress, 96-M, 116-M. - Seventh International Botanical Congress, 116-M.

D.

DOMINICAN REPUBLIC: Decree of November 18, 1939 relative to the importation of used empty sacks, 105-M.

E.

EASTERN MARCHE: Circular of January 19, 1940 relative to the control of the San José scale (*Aspidiotus perniciosus*), 123-M. See also Ostmark.

England and Wales: Importation of plants (Amendment) Order, 1940, relative to the control of Colorado beetle (*Leptinotarsa decemlineata*), 123-M. - Importation of Raw Cherries Order, of May 3, 1940, relative to the control of the cherry fruit fly (*Rhagoletis cerasi*), 123-M. - Rabbit Order of October 12, 1939 relative to the killing and taking of rabbits causing important damages to crops or trees of wastage of pasturage, 193-M.

Estonia: Elm disease in the country, 2-M.

F.

FRANCE: Beetles injurious to fruit trees, 142-M. - Colorado beetle in 1939, 120-M. - Decree of December 2, 1939 relative to an Advisory Committee that has been set up at the Ministry of Agriculture to deal with questions concerning fertilizers, fungicides and insecticides, 82-M. - D. of March 10, 1940 relative to the nicotine, 144-M. - Ministerial Decree of December 16, 1939 relative to the members of the fertilizers, fungicides, and insecticides Advisory Committee, set up by the Decree of December 2, 1939, 82-M. - M. D. of December 27, 1939 relative to the importers and exporters of vegetable products, 104-M. - M. D. of March 11, 1940 relative to the sanitary inspection of potato crops for seed, 144-M. - M. D. of April 1, 1940 relative to the control of the Colorado beetle (*Leptinotarsa decemlineata*), 124-M.

G.

GERMANY: Agreements relative to consignments by post of predatory insects and other enemies of pests, 214-M. — Amendment of March 26, 1940 to the Ordinance of October 8, 1937 relative to the control of potato wart disease (*Synchytrium endobioticum*), 165-M. — Circular of October 3, 1939 relative to the control of the fungus (*Adelopus*) which attacks the needles of the Douglas fir (*Pseudotsuga douglasii*), 102-M. — C. of December 14, 1939, relative to the use of phosphureted hydrogen in the control of the corn weevil (*Calandra granaria*), 103-M. — C. of February 8, 1940 relative to the control of noxious insects, 213-M. — C. of March 11, 1940 relative to the use of preparations made with copper salts, 165-M. — C. of April 8, 1940 relative to the control of rabbits, 238-M. — C. of July 9, 1940 relative to the control of the Colorado beetle (*Leptinotarsa decemlineata*), 214-M. — Colorado beetle situation in 1939, 49-M. — Communication No. 82 of April 10, 1940 giving notification of certain restrictions applied to trade in insecticides and fungicides, 192-M. — Decree of July 1, 1939 relative to the control of diseases and pests of plants cultivated in former Austria (Ostmark) and in the Sudeten districts (Sudetenland), 6-M. — D. of August 8, 1939 relative to the control of the San José scale (*Aspidiotus perniciosus*), 6-M. — D. of August 15, 1939 relative to the control of potato wart disease (*S. endobioticum*), 7-M. — D. of August 21, 1939 relative to the control of the San José scale (*A. perniciosus*) and apple maggot (*Rhagoletis pomonella*), 7-M. — D. of October 11, 1939 relative to the use of gins, 32-M. — D. of October 25, 1939 relative to the preservation of natural sites in the Sudetenland, 32-M. — D. of October 26, 1939 relative to the control of the pests and diseases of fruit trees

in the Ostmark (formerly Austria) and in the Sudetenland, 33-M. — D. of November 21, 1939 relative to the control of the San José scale (*A. perniciosus*) in Austria, 103-M. — D. of May 21, 1940 relative to the Colorado beetle (*L. decemlineata*), 193-M. — D. of May 23, 1940 relative to the control of the musk rat (*Fiber zibethicus*), 214-M. — Disposition of September 25, 1940 relative to the transport of nursery plants from the Protectorate of Bohemia and Moravia into Germany, 239-M. — Law of September 1, 1939 relative to the incorporation in the Reich of the former Free City of Danzig, 239-M. — List of the communes infested with grape phylloxera (*Dactylosphuera vitifolii*) and those suspected or in danger of being infested, 192-M. — Ministerial order of November 4, 1939 relative to the control of carnation leaf roller (*Tortrix pronubana*), 33-M. — M. O. of March 14, 1940 relative to the control of the carnation leaf roller, 122-M. — New edition of police regulations ('Polizeivorschriften'), giving a list of the police ordinances relative to the transport of plants, 122-M. — Notice of the Corporation of Agriculture of May 25, 1940 relative to the control of the Colorado beetle (*L. decemlineata*) 166-M. — Notification of August 14, 1939 relative to the control of potato wart disease (*S. endobioticum*), 7-M. — N. of September 20, 1939 modifying the seventh Decree of May 4, 1939 relative to the Colorado beetle (*L. decemlineata*), 32-M. — N. of November 8, 1939 relative to the control of the Colorado beetle (*L. decemlineata*), 103-M. — N. of December 20, 1939, relative to plant protection, 103-M. — N. of August 24, 1940 relative to the modifications brought into force by Ordinance of October 8, 1937 regarding the control of the potato wart disease (*S. endobioticum*), 239-M. — O. of August 10, 1939 relative to the control of wart disease (*S. endobioticum*), 32-M. —

O. of September 27, 1939 relative to the control of San José scale (*A. perniciosus*), 32-M. — O. of November 21, 1939 relative to the import of plant and vegetable products, 33-M. — O. of December 18, 1939 relative to trade in seed potatoes, 103-M. — O. of January 23, 1940 relative to bird protection, 213-M. — O. of February 13, 1940 relative to the sale of toxic preparations for plant protection, 121-M. — O. of March 28, 1940 relative to the control of the San José scale (*A. perniciosus*), 123-M. — O. No. 4/40 of March 29, 1940 relative to the regulations regarding trade in potatoes, 165-M. — O. of April 2, 1940 relative to the trade of potatoes, 192-M. — O. of April 3, 1940 relative to potato varieties resistant to wart disease (*S. endobioticum*), 192-M. — O. of May 23, 1940 giving a list of the grape varieties used as stocks which are authorised for cultivation in Prussia, 214-M. — Provision of August 10, 1939 relative to the control of potato wart disease (*S. endobioticum*), 7-M. — Regulations published on April 29, 1940 relatives to the use of movable disinfection chambers, 214-M. — Research station established at Krufft for the control of the Colorado beetle (*L. decemlineata*), 123-M. — Rules published on April 22, 1940 relative to the application of the 'Cartox' process, based on the use of a mixture of ethylene oxide and carbonic acid, 213-M. See also: G. (Bavaria), 239-M. — G. (Bohemia and Moravia Protectorate), 7-M, 33-M, 143-M, 166-M, 214-M. — G. (Brunswick), 9-M. — G. (Eastern Marche), 123-M. — G. (Oldenburg), 215-M. — G. (Ostmark), 215-M, 240-M. — G. (Prussia), 34-M. — G. (Saxony), 215-M. — G. (Sudetenland), 9-M. — G. (Thuringia), 35-M. — G. (Württemberg), 215-M.

Great Britain: Act of July 28, 1939 (Prevention of Damage by Rabbits Act, 1939) relative to the prevention of damage by these rodents and the use

of spring traps and poison for the purpose of killing hares and rabbits, 35-M.

Greece: Control of olive fly, 50-M. — Royal Decree of April 5, 1938 declaring the Island of Lemnos infested with grape phylloxera, 57-M. — R. D. of December 22, 1939 declaring the department of Larissa, with the exception of the Zagora region, to be infested with phylloxera, 57-M. — Scale insects observed on citrus in the island of Crete, 2-M. — Scale insects observed on citrus trees in the islands Skiathos, Skopelos and Sakiz-Adasi, 75-M.

I.

INDIA: Notification No. F. 46-20/38-A of December 6, 1939 adding in rule 12 of the Order published with the Notification No. F. 320-35-A. of July 20, 1936, after the words 'produced in India', the words 'or in Burma', 124-M. — N. No. F. 50-33/39-A of December 7, 1939 substituting some words in paragraph 4 of the Order published with the Notification No. F. 320-35-A of July 20, 1936, 124-M. — New plant diseases recorded in 1939, 163-M.

Italian East Africa: Decree No. 803 of September 4, 1939 relative to the regulations for the conservation and management of coffee estates in Harar, 5-M. — Insects and other crop pests in 1939, 137-M. — Locusts, 1-M, 97-M. — Notes on the geographic distribution and biology of *Epilachna (Solanophila) canina* var. *scioana* and subsp. *vulpecula*, 209-M. Plant diseases reported in 1939, 117-M.

Italian Somaliland: Locusts, 30-M.

Italy: Circular No. 476 of April 4, 1940 relative to the registration of agricultural parasitocides, 194-M. — Faculty given to administrators of different provinces to authorize the hunting and capture of sparrows with a view to preventing damage to early and very early wheats, 167-M. — Law No.

835 of May 30, 1940, ratifying the Italo-German Agreement relative to frontier trade for the protection of crops, 195-M. — List of the communes in the Kingdom that were declared to be, or suspected of being, infested with grape phylloxera on December, 31, 1939, 35-M. — Ministerial Circular No. 469 of February 22, 1940 relative to the control of the downy mildew of the vine (*Plasmopara viticola*), 125-M. — M. C. No. 470 of March 26, 1940 relative to the control of the downy mildew of the vine and the peacock eye of the olive tree (*Cycloconium oleaginum*), 167-M. — Ministerial Decrees of October 5 and 7, 1939 declaring the communes of Ripatransone, Massa Fermana and Falerone, Province of Ascoli Piceno, infested with grape phylloxera, 35-M. — M. Ds. of October 19 and 21, 1939 declaring the communes of Montebubbiano, Province of Ascoli Piceno, and Serrone, Province of Frosinone, infested by grape phylloxera, 35-M. — M. D. of January 1, 1940 relative to the control of the olive fly (*Dacus oleae*), in the commune of Pisciotta 167-M. — M. D. of January 27, 1940 relative to cotton plantations, 194-M. — M. D. of February 10, 1940 making compulsory the control of the European corn borer (*Pyrausta nubilalis*), and the maize stalk borer (*Sesamia cretica*), 104-M. — M. D. of March 15, 1940 authorizing hunting and capture of wild rabbits in the province of Ravenna, 167-M. — M. D. of March 15, 1940 authorizing the hunting and capture of rabbits in the Provinces of Milan and Turin, 167-M. — M. D. of March 30, 1940 relative to the control of the olive fly (*D. oleae*) in Sardinia, 167-M. — M. D. of April 5, 1940 relative to the control of the cockchafer (*Melolontha melolontha*), 194-M. — M. D. of April 22, 1940 opening a competition on the basis of qualifications and written examinations for the award of twelve scholar-

ships for advanced study in plant pathology and agricultural entomology at the Royal Institutes of Phytopathological Research and Experimentation and at the Royal Observatories for Plant Diseases, 125-M. — M. D. of May 11, 1940 relative to the hunting and capture of rabbits in the province of Novara, 195-M. — M. D. of June, 19, 1940 relative to the hunting and capture of rabbits in the Island of Gorgona, 195-M. — M. D. of June 27, 1940 relative to a competition for the industrial cultivation of pyrethrum (*Chrysanthemum cinerariaefolium*) in the Provinces of Pola, Zara, Reggio Calabria, Cosenza and Sassari, 195-M. — M. D. of June 30, 1940, relative to the control of the olive fly (*D. [Daculus] oleae*), in the Province of Sassari, Cagliari and Nuoro, 195-M. — M. D. of July 5, 1940 relative to the hunting and capture of wild rabbits, 215-M. — M. D. of July 8, 1940 relative to the import from abroad of potatoes intended solely for planting, 215-M. — M. D. of August 14, 1940 relative to the hunting and capture of rooks, hooded crows and jackdaws, declared pests in the province of Agrigento, 215-M. — M. D. of August 14, 1940 relative to the hunting and capture of roots, hooded crows, jackdaws, jays, shrikes and bee-eaters, declared pests in the Province of Sassari, 241-M. — Rice-growing Experiment Station of Vercelli: practical and public demonstration of physical methods for the disinfection and the storage of cereals, 105-M. — Royal Decree No. 2054 of September 22, 1939 setting up an Agricultural Section of Technical Institute of the Royal Agronomic Institute for Italian Africa, 57-M. — R. Dees Nos. 197 and 198 of February 29, 1940 relative to the biennial courses to be held at the Agricultural Section of Technical Institute for colonial agriculture, 125-M. — R. D. No. 757 of May 13, 1940 relative to measures on the sanitary protection of fruit

plants, 195-M. — Specialized course in plant diseases instituted under the auspices of the Ministry of Agriculture and Forests at the University of Pisa, 10-M.

J.

JAMAICA: Government Notice No. 712 of September 10, 1938, relative to the transshipment of citrus fruits from Spanish Honduras and British Honduras at the port of Port Antonio, 10-M. — Law No. 21 of June 19, 1939 relative to the control of *Cercospora* leaf spot of bananas (*Cercospora musae*), 58-M. —

K.

KENYA: Government Notice No. 551 of July 28, 1939 relative to plant protection, 83-M. — G. N. No. 969 of November 17, 1939 relative to the control of dodder (*Cuscuta* spp.), 84-M. — G. N. No. 970 of November 17, 1939 amending the Schedule to G. N. No. 688 of September 2, 1937, 84-M. — G. N. No. 127 of February 3, 1940 amending G. N. No. 687 of September 2, 1937, 195-M.

L.

LEGISLATIVE AND ADMINISTRATIVE MEASURES IN THE FOLLOWING COUNTRIES: Argentine Republic, 104-M. — Australia (New South Wales), 124-M. — Australia (Queensland), 56-M. — Australia (South A.), 124-M. — Australia (Western A.), 10-M, 56-M, 81-M, 144-M. — Bavaria, 239-M. — Belgium, 81-M, 124-M. — Bohemia, 7-M, 33-M, 143-M, 166-M, 214-M. — Brunswick, 9-M. — Burma, 56-M. — Canada, 10-M. — Chile, 35-M, 56-M. — Colombia, 166-M. — Dominican Republic, 105-M. — Eastern Marche, 123-M. — England and Wales, 123-M, 193-M. — France, 82-M, 104-M, 124-M, 144-M. — Germany, 6-M, 32-M, 102-M, 121-M, 165-M, 190-M, 209-M, 213-M, 238-M. — Great

Britain, 35-M. — Greece, 57-M. — India, 124-M. — Italian East Africa, 5-M. — Italy, 10-M, 36-M, 57-M, 104-M, 125-M, 167-M, 194-M, 215-M, 241-M. — Jamaica, 10-M, 58-M. — Kenya, 83-M, 195-M. — Luxemburg, 58-M, 144-M. — Mauritius, 11-M. — Mexico, 11-M, 216-M. — Moravia, 7-M, 33-M, 143-M, 166-M, 214-M. — Morocco (French Zone of), 35-M, 59-M, 84-M, 105-M, 168-M, 195-M. — Netherlands (The), 145-M. — New Zealand, 11-M, 59-M, 584-M, 145-M, 168-M. — Nyasaland, 59-M. — Oldenburg, 210-M. — Ostmark, 215-M, 240-M. — Paraguay, 168-M. — Portugal, 196-M. — Prussia, 34-M. — Reunion, 60-M. — Rumania, 196-M. — Saint Vincent (Colony of), 146-M. — Saxony, 215-M. — Scotland, 193-M. — Spain, 10-M, 191-M, 240-M. — Straits Settlements, 56-M. — Sudetenland, 9-M. — Sweden, 216-M. — Switzerland, 125-M, 216-M. — Switzerland (Canton of Bern), 146-M. — Syrian Republic, 145-M. — Thuringia, 35-M. — Union of South Africa, 11-M, 36-M, 196-M. — United States of America, 10-M, 56-M, 104-M, 166-M, 191-M, 240-M. — Uruguay, 11-M, 85-M, 168-M, 196-M. — Württemberg, 215-M.

Luxemburg (Grand Duchy of): Colorado beetle situation during 1939, 76-M. — Decree of May 11, 1939 relative to the control of the Colorado beetle (*Leptinotarsa decemlineata*), 58-M. — D. of March 21, 1940 relative to the creation of a Commission for crop improvement, 144-M. — D. of March 26, 1940 relative to the delivery of certificates and documents of the Phytopathological Service, 145-M.

M.

MAURITIUS: Proclamation No. 21 of August 24, 1939 relative to the control of citrus canker (*Pseudomonas citri*), 11-M.

Mexico: 'Acuerdo' of June 29, 1939 relative to the control of Sigatoka disease (*Cercospora musae*) locally

known as 'chamusco', 11-M. — 'A.' of August 4, 1939 relative to the control of 'chapulín' (*Melanoplus* sp.) in the States of Aguas Calientes and Zacatecas, 216-M. — 'Cuarentena exterior,' No. 3 of July 17, 1927, revised on November 12, 1929 relative to the pink cotton bollworm (*Platyedra gossypiella*) in certain countries of the State of Nuevo México recognized as being infested with the 'gusano rosado', 216-M.

Moravia see Bohemia.

Morocco (French Zone of): Decree of September 12, 1939 repealing the Decrees of December 30, 1938 and July 6, 1939 permitting the destruction of rabbits in the Rabat region and the territory of Port-Lyautey, 59-M. — D. of October 16, 1939 relative to the control of the pink cotton bollworm (*Platyedra gossypiella*) and the spiny bollworm (*Earias insulana*), 35-M. — D. of October 16, 1939, relative to the regulation of cotton seed production and distribution, 36-M. — D. of November 15, 1939 authorizing the destruction of rabbits causing considerable damage to plantations and crops in certain areas in the region around Rabat, 84-M. — D. of December 30, 1939 laying down the measures to be taken for the replanting of vine-yards attacked by phylloxera, 105-M. — D. of January 8, 1940 relative to the control of the pink cotton bollworm (*P. gossypiella*) and the spiny bollworm of cotton (*E. insulana*), 59-M. — D. of January 12, 1940 authorising the destruction of rabbits causing considerable damage to crops and plantations in certain districts in the territory of Port-Lyautey, 105-M. — D. of January 25, 1940 authorising the destruction of rabbits causing damage to crops and plantations in certain zones of the civil administrative area of Kariaba-Mohammed, Fez, 105-M. — Order of March 29, 1940 relative to the destruction of rabbits causing serious damage to crops and plantations in certain

zones of the civil administrative area of Rabat-banlieue, 168-M. — O. of April 5, 1940 relative to the destruction of rabbits in some zones of the civil administrative area of Sefrou, Fez, 196-M. — O. of May 1, 1940 relative to the destruction of rabbits in some zone of the civil administrative area of Meknès-banlieue, 196-M. Mozambique: Fungi, bacteria and diseases of unknown origin observed in the Colony, 28-M.

N.

NETHERLANDS (The): Colorado beetle (*Leptinotarsa decemlineata*) situation in 1939, 4-M, 78-M. — Regulation No. 7842 of July 31, 1939 relative to the work of the Commission for narcissus diseases, 145-M. — Royal Decree No. 21 of June 10, 1939 nominating the members of the Commission for narcissus diseases, 145-M.

New South Wales, see Australia.

New Zealand: Grape-vine Diseases Regulations 1939 of September 20, 1939 relative to the control of downy mildew of grape (*Plasmopara viticola*) and vine-louse or phylloxera (*Phylloxera vastatrix*), 145-M. — Noxious Weeds Act Extension Order 1939, of November 8, 1939 extending the second Schedule to the Noxious Weeds Act, 1928, 145-M. — Special Order of August 1, 1939 made by the Clutha County Council and published by the Minister of Agriculture on September 1, 1939 declaring *Senecio jacobaea* a noxious weed within the said County, 11-M. — S. O. of September 28, 1939 relative to all plants mentioned in the Second Schedule of the Noxious Weed Act, 1928, 145-M. — S. O. of October 5, 1939 declaring the variegated thistle (*Silybum marianum*) to be a noxious weed in the Awatere County, 59-M. — S. O. of November 8, 1939 declaring the bathurst burr (*Xanthium spinosum*) to be a noxious weed within the boundaries of the County of Hauraki Plains

County, 84-M. - S. O. of February 26, 1940 declaring to be noxious weeds within the Papakura Borough all the plants mentioned in the Second Schedule of the Noxious Weeds Act, 1928, 168-M.

Nyasaland: Tobacco Pest Rules, 1939 published by Government Notice No. 44 of July 3, 1939 relative to the control of *Lasioderma serricorne*, *Ephestia elutella* and such other insect organisms or pest of tobacco, 59-M.

O.

OLDENBURG: Decree of May 24, 1940 relative to the control of the corn weevil (*Calandra granaria*), 215-M.

Ostmark: Decree of December 2, 1939 relative to the regulations on imports, exports and transit in former Austria, according to the resolutions adopted at the International Phylloxera Convention of November 3, 1881, 215-M. - Regulations of July 20 and August 7, 1940 relative to the control of the San José scale (*Aspidiotus perniciosus*), 240-M. See also Eastern Marche.

P.

PALESTINE: Diseases of industrial and medicinal plants, 77-M. - Diseases of ornamental plants, 181-M, 229-M.

Paraguay: Decree No. 165 of March 15, 1940 adding to the list of agricultural pests of the country the weevil *Conotrachelus denieri* harmful to cotton, 168-M.

Portugal: 'Portaria' No. 9:527 of May 14, 1940 relative to the control of some parasites, 196-M.

Prussia: Decree of September 29, 1939 making compulsory in certain districts of the province of Silesia the control of the winter moth and the mottled umber moth (*Chematobia brumata*, *Hibernia defoliaria*), 34-M.

Q.

QUEENSLAND, see Australia.

R.

REUNION: Decree of February 5, 1940 relative to the control of mosaic disease of cassava (*Manihot*), 60-M.

Rumania: Ministerial Decision No. 8218 of May 2, 1940 relative to the dry disinfection of seeds, 196-M.

S.

SAINT VINCENT (Colony of): Order in Council made under the Plant Protection Ordinance, No. 14 of 1935, on February 18, 1939 relative to the transfer or conveyance of seed cotton, 146-M. - O. in C. of April 3, 1939 relative to the regulations of the Cotton Protection Ordinance, 146-M. - Proclamation of June 5, 1939 amending the Proclamation of August 1, 1935, 146-M.

Saxony: Decree of May, 22, 1940 relative to the control of asparagus rust (*Puccinia asparagi*), 215-M.

Scotland: Deer (Scotland) Order, 1939 of November 2, 1939 authorising the killing and taking of deer injurious to crops, trees, pasturage, fences, banks or work, 193-M. - Order of October 19, 1939, relative to the provisions regarding damage by deer, hares and rabbits to crops in Scotland, 193-M. - Hares and Rabbits (Scotland) Order, 1939, of November 2, 1939 relative to the killing and taking of hares and rabbits for the purpose of preventing damage to crops, trees, pasturage, fences, banks, or works, 193-M.

South Australia, see Australia.

Southern Rhodesia: Locusts, 5-M, 55-M, 79-M, 102-M, 121-M, 143-M, 165-M.

Spain: Decree of August 13, 1940 relative to the reorganization of the Plant Protection Service, 240-M. - 'Orden' of September 22, 1939 relative to locust control, 10-M. - 'O.' of June 10, 1940 relative to locust control 193-M. - 'O.' of June 22, 1940 relative to the export of plants, 193-M. - 'O.'

- of September 5, 1940 relative to the control of the yellow stalk borer (*Se-samia vutieria*), 240-M. - Colorado beetle in 1939, 120-M.
- Straits Settlements: Ordinance No. 26 of September 11, 1939 relative to the import of plants, 56-M.
- Sudetenland: Decree of August 23, 1939 relative to the trade in poisons, 9-M.
- Sweden: Royal Decree No. 639 of June 28, 1940 regulating the use of hydro-cyanic acid gas in the control of plant pests in greenhouses, 216-M. - R. D. No. 768 of August 19, 1940 relative to the import of plants and parts of plants, 216-M.
- Switzerland: Colorado beetle (*Leptino-tarsa decemlineata*) situation in 1939, 31-M, 79-M, 211-M. - Decree of February 16, 1940 relative to the control of the potato wart disease (*Synchytrium endobioticum*), and the Colorado beetle (*L. decemlineata*), 125-M. - D. of July 6, 1940 relative to the import of fresh fruits, trees, shrubs, living plants and parts of plants, 216-M. - Ordinance of June 13, 1939 relative to the control of the Colorado beetle (*L. decemlineata*) in the Canton of Bern, 146-M.
- Syrian Republic: Decree No. 354 L. R. of December 11, 1939 relative to the import into and transit through Syria and Lebanon of banana plants and bananas of any origin, 145-M.

T.

- THURINGIA: Notification of October 12, 1939 relative to the control of potato wart disease (*Synchytrium endobioti-cum*), 35-M.

U.

- UNION OF SOUTH AFRICA: Proclamation No. 50 of March 14, 1939 relative to the control of the bacterial blight of vines (*Bacillus vitivorus*), 36-M. - P. No. 155 of July 22, 1939, amending the Proclamation No. 286 of November

6, 1936, 11-M. - P. No. 48 of March 4, 1940 amending the Schedule to Proclamation No. 286 of 1936-M.

- United States of America: Amendment No. 1 to the rules and regulations (seventeenth revision) supplemental to Notice of Quarantine No. 48 on account of the Japanese beetle (*Popillia japonica*), approved on June 22, 1939 and effective on July 1, 1939, 10-M. - A. No. 4 to the rules and regulations supplemental to Notice of Quarantine No. 71 relative to the Dutch elm disease (*Ceratostomella ul-mi*), 56-M. - A. No. 1 to the revised regulations supplemental to Notice of Quarantine No. 52, approved on September 11, 1939 and effective on September 15, 1939, amending regulations 2, 3 and 4, relatively to the control of the pink cotton bollworm (*Platyedra gossypiella*) on okra (*Hibiscus esculentus*), 57-M. - A. No. 2 to the revised regulations supplemental to Notice of Quarantine No. 52, approved on September 23, 1939 and effective on September 25, 1939 relative to the control of the pink cotton bollworm (*P. gossypiella*), 57-M. - A. No. 3 to the revised regulations supplemental to Notice of Quarantine No. 52, approved on November 15, 1939 and effective on November 20, 1939 relative to the control of pink cotton bollworm (*P. gossypiella*), 104-M. - A. No. 1 to the rules and regulations supplemental to Notice of Quarantine No. 56 approved on February 24, 1940 and effective on February 27, 1940 relative to the import of fruits and vegetables, 166-M. - A. No. 2 to the rules and regulations supplemental to Notice of Quarantine No. 48 relative to the Japanese beetle (*P. japonica*), 240-M. - Act approved on August 9, 1939 relative to the control of the pink bollworm (*P. gossypiella*), affecting cotton within the United States and Mexico, 10-M. - A. of April 26, 1940 relative to the control of the white pine blister rust (*Cronartium ribicola*), 194-M. - Notice

of Quarantine No. 64 (third revision) relative to the control of the Mexican fruit fly (*Anastrepha ludens*), 104-M. — N. of Q. No. 73 of March 20, 1940 relative to the control of the coffee berry borer (*Stephanoderes hampei*) and the coffee rust (*Hemileia vastatrix*), 167-M.

Uruguay: Decree No. 380/935 of May 24, 1939 modifying the Decree No. 380/935 of September 29, 1937, regulating the agricultural insecticide and fungicide trade, 11-M. — D. No. 572/938 of December 6, 1939 declaring noxious weed Aleppo grass (*Sorghum halepense*) locally called 'sorgo de Alepo', 'pasto ruso', and 'pasto polaco', 85-M.

— D. of February 21, 1940 declaring pests of national agriculture the three citrus diseases known as 'lepra explosiva', 'clorosis zonada', and 'psorosis', 168-M. — D. No. 214/940 of April 11, 1940 declaring a pest of national agriculture the scale insect *Epidiaspis pyricola* (*Diaspis leperii*), 196-M.

W.

WALES, see England.

Western Australia, see Australia.

Württemberg: Decree of March 15, 1940 relative to the protection of bees, 215-M.

II. — Alphabetical List of Collaborators.

(OFFICIAL CORRESPONDENTS FOR PLANT PROTECTION TO THE INTERNATIONAL INSTITUTE OF AGRICULTURE).

ALFARO CARDOSO, JÚLIO GARDÉ, 28-M.
APEDAILE, I. G. S., 56-M.
AYOUTANTIS, A., 2-M, 50-M, 57-M, 75-M.

BIOLOGISCHE REICHSANSTALT FÜR LAND-
UND FORSTWIRTSCHAFT, 49-M.
BITANCOURT, AGESILAU A., 25-M.
BOZZI, LUIGI, 30-M.

CICCARONE, ANTONIO, 117-M.

DE BENEDICTIS, ANTONIO, 209.
DEPARTMENT OF AGRICULTURE AND
FORESTRY [UNION OF SOUTH AFRICA],
196-M.

DEPARTMENT OF AGRICULTURE AND
FORESTRY, DIVISION OF ENTOMOLOGY,
[UNION OF SOUTH AFRICA] 11-M.

FEDERAL EXPERIMENT AND SEED CON-
TROL STATION [SWITZERLAND], 211-M.
FEYTAUD, JEAN, 120-M, 142-M.

GILLEN, M., 76-M.
GOVERNMENT GENERAL OF ITALIAN EAST
AFRICA, 1-M, 97-M.
GOYTIA ABEL, 161-M.

JACK, RUPERT W., 5-M, 55-M, 79-M,
102-M, 120-M, 143-M, 165-M.
JANNONE, GIUSEPPE, 137-M, 209-M.

LEPIK, E., 2.

MARCHIONATTO, JUAN B., 25-M, 99-M.
MAYNÉ, R., 101-M.

MINISTRY OF AGRICULTURE [ITALY],
194-M.

MINISTRY OF AGRICULTURE [SPAIN],
120-M.

MINISTRY FOR ITALIAN AFRICA, 117-M,
137-M.

NOBLE, R. J., 99-M.

PADWICK, G. WATTS, 163-M.

REICHERT, I., 77-M, 181-M, 229-M.

SMALL, THOMAS, 101-M.

TOMASELLO, JUAN F., 73-M.

VAN DER MERWE, C. P., 36-M.
VAN PORTEREN, N., 4-M, 78-M.

WAHLEN, F. T., 31-M, 79-M.

III — Alphabetical List of Authors mentioned under the heading 'Recent Bibliography' of the *Bulletin*.

- AAMISEPP, Jul., 37-M.
 Abalos, Roman, 61-M.
 Abbott, E. V., 147-M.
 Abbott, E. V. see Rands, R. D., 156-M.
 Afanasiev, M. see Spaeth, J. Nelson, 46-M.
 Afanasieva, O. V., 197-M.
 Agati, J. A. see de Peralta, F., 62-M.
 Agati, Julian A. and de Peralta, Fernando, 241-M.
 Aggèry, Berthe see Nicolas, Gustave, 66-M, 204-M, 249-M.
 Ahmad, Sultan see Sydow, H., 134-M.
 Ahmad, Taskhir, 37-M.
 Ainsworth, G. C., 85-M.
 Ajroldi, Paolo, 37-M, 126-M.
 Akai, Shigeyasu, 168-M.
 Akai, Shigeyasu see Hemmi, Takewo, 172-M.
 Aleksandrovskaja-Ivanova, Z. V., 168-M.
 Alexopoulos, Const. J., 216-M.
 Alfaro, Agustín, 147-M.
 Allen, Norman see Rainwater, C. F., 93-M.
 Allen, T. C. and Rieman, G. H., 106-M.
 Allison, J. Lewis see Hart, Helen, 110-M.
 Allman, S. L., 37-M.
 Alvarado, Juan Antonio, 85-M, 168-M.
 Ambros, W., 61-M.
 Amer, A. see Shafik, Mohamed, Amer, A. and Hilmy, A. L., 157-M.
 Anderson, Lauren D. and Walker, Harry G., 126-M.
 Anderson, Lauren D. see Walker, Harry G., 22-M, 96-M.
 Anderson, P. J., 168-M.
 Andrewartha, H. G., 37-M.
 Andria, G., 126-M.
 Anet, H., 241-M.
 Appel, Otto, 12-M.
 Appel, O. und Riehm, E., 168-M.
 Araujo, R. L., 147-M, 197-M.
 Araujo, R. L. see Fonseca, J. Pinto da, 151-M.
 Archangelski, E. P., 168-M.
 Arenz, B. see Schropp, W., 94-M.
 Arikado, Hiroki see Yamasaki, Morimasa, 160-M.
 Arion, Georges, 168-M.
 Ark, P. A., 106-M.
 Ark, P. A. and Thomas, H. Earl, 216-M.
 Ark, P. A. see Thomas, H. Earl, 227-M.
 Ark, P. A. see Tompkins, C. M., Ark, P. A., Tucker, C. M. and Middleton, J. T., 47-M.
 Armagnac, 37-M.
 Arnold, H. C., 241-M.
 Arruda, S. C., 61-M.
 Ashraf, Mohd see Vasudeva, R. Sahai, 47-M.
 Askew, H. O. and Williams, W. R., 241-M.
 Atanasov, D., 85-M, 147-M.
 Atherton, D. O., 169-M.
 Atkinson, R. E., 147-M.
 Attia, Rizk and Mattar, Bishara, 241-M.
 Audus, L. J., 61-M.
 Austin, M. D. see Jary, S. G., 41-M.
 Autuori, M., 197-M.
 Avenel, André, 85-M.
 Avizohar, Zehara see Reichert, I., 93-M.
 Aversa Saccà, Rosario, 126-M.
 Ayers, G. W. and Hurst, R. R., 241-M.
 Ayers, T. T., Lefebvre, C. L. and Johnson, H. W., 197-M.
 Ayyar, T. V., 12-M, 126-M.
 Azzaroli, F. see Goidànich, Gabriele, 40-M.
 BABARAN, JOSÉ M., 241-M.
 Back, E. A., 216-M.
 Badcock, E. C., 37-M.
 Badea, M. see Georgescu, Const. C., 221-M.
 Baerg, W. J., 197-M.
 Bain, Douglas C., 85-M.
 Baines, R. C., 85-M.
 Baker, R. E. D., 12-M, 126-M.
 Baker, W. A. and Questel, D. D., 85-M.

- Baker, W. A. see Schlosberg, Morris, 94-M.
 Baker, W. C. see Whitten, R. R., 135-M.
 Balachowsky, A., 37-M, 61-M, 147-M.
 Balachowsky, A. A. see Picard, F., 67-M.
 Balachowsky, A. et Viennot-Bourgin, G., 106-M.
 Balbach, Hans, 241-M.
 Balch, R. E., 61-M.
 Baldacci, Elio e Cabrini, Flisa, 37-M.
 Baldrati, Isaia see Ciferri, Raffaele, 127-M.
 Baldwin, Henry I., 241-M.
 Baldwin, I. L. see Riker, A. J., 93-M.
 Banu, C., 242-M.
 Barbacka, Krystyna, 38-M.
 Barber, George W., 85-M, 106-M, 169-M, 216-M.
 Barcia Trelles, Juan, 38-M.
 Barnes, Dwight F., Fisher, Charles K., and Kaloostian, George H., 217-M.
 Barnes, H. F., 38-M, 86-M, 106-M.
 Barr, C. G., 217-M.
 Bartlett, Kenneth A., 147-M, 148-M.
 Barzinsky, R. M., 197-M.
 Batchelder, C. H., 86-M.
 Ba Te, A., 85-M.
 Batra, H. N. see Pruthi, Hem Singh, 16-M.
 Bawden, F. C., 86-M.
 Baylis, G. T. S., 148-M.
 Beal, J. A., 217-M.
 Beall, Geoffrey, Stirrett, Geo. M. and Connors, I. L., 12-M, 61-M.
 Becker, A., 38-M.
 Becker, Hauna see Hart, Helen, 90-M.
 Bedi, Kishan Singh see Luthra, Jai Chand, Sattar, Abdus and Bedi, Kishan Singh, 111-M.
 Beecher, F. S. see Doolittle, S. P., Beecher, F. S. and Porte, W. S., 108-M.
 Beeson, C. F. C. and Chatterjee, S. N., 197-M.
 Belli, Alfredo G., 38-M.
 Bellio, G., 242-M.
 Ben-Amotz, Y., 217-M.
 Benedetti, A., 197-M.
 Benjamin, M. S. and Old, A. N., 126-M.
 Benlloch, Miguel, 126-M, 169-M.
 Benlloch Martínez, Miguel, 242-M.
 Benlloch [Martínez], Miguel y Domínguez, Francisco, 242-M.
 Bennett, C. W., 217-M.
 Bergeal, A., 106-M.
 Bernardi, Bernardo, 61-M.
 Bernhardt, Erich, 217-M.
 Berry, P. A., 106-M.
 Bertin, Charles, 126-M.
 Bertram, L. und Mannheims, B., 38-M.
 Bertrand, Gabriel et Silberstein, Lazare, 106-M.
 Beshir, M. and Hosny, M., 242-M.
 Best, Rupert J., 242-M.
 Bever, Wayne M., 86-M.
 Bigger, J. H. and Flint, W. P., 86-M.
 Biologische Reichsanstalt für Land- und Forstwirtschaft in Berlin-Dahlem, 169-M.
 Biraghi, Antonio, 106-M, 169-M, 242-M.
 Bissel, Theodore L., 86-M.
 Bitancourt, A. A., 148-M.
 Bitancourt, A. A. see Jenkins, Anna E., 201-M.
 Bitancourt, A. A. e Jenkins, Anna, E., 126-M, 197-M.
 Bitter, Bernd und Niklas, Otto-Friedrich, 61-M.
 Blanchard, Everard E., 38-M.
 Blanton, F. S., 106-M.
 Blattný, Ctibor, 169-M.
 Bliss, C. I., 61-M.
 Blunck, H., 242-M.
 Blunck, H., Meyer, E. u. Neu, W., 61-M.
 Bobb, M. L., 106-M.
 Bobb, M. L., Woodside, A. M. and Jefferson, R. N., 217-M.
 Bockmann, Hans, 217-M.
 Bogatova, Z. K., 242-M.
 Bohart, R. M., 217-M.
 Bohorquez, Rafael, 242-M.
 Boln, G. W. and Tucker, C. M., 61-M.
 Bois, Eric-J., 242-M.
 Boischot see Vincent, Boischot et Herviaux, 116-M.
 Bondar, Gregorio, 169-M, 197-M, 217-M.
 Bonde, Reiner, 86-M, 126-M.
 Bondy, Floyd F., 217-M.
 Bongini, Virginia, 106-M.
 Bonnemaïson, L., 61-M, 107-M.
 Bonnet, Pierre, 126-M.
 Borasio, L. e De-Rege, F., 107-M.

- Boresch, Karl, 61-M.
 Börner, Carl, 86-M.
 Borzini, Giovanni, 242-M.
 Borzini, Giovanni et Marini Bettolo, Giovanni Battista, 107-M.
 Boshier, J. E. see Hastings, R. J., Boshier, J. E. and Newton, William, 129-M.
 Bott, Richard, 61-M.
 Bottger, G. T., 217-M.
 Bouhélier, R., 86-M.
 Bouriquet, G. see Heim, Roger, 40-M.
 Bowman, J. J. see Siegler, E. A., 252-M.
 Box, Harold E., 148-M.
 Boyce, A. M., Kagy, J. F., McCall, G. L. and La Due, J. P., 242-M.
 Boyce, A. M. and Persing, C. O., 107-M.
 Brammanis, Leo, 86-M.
 Branas, J., 38-M.
 Branquinho de Oliveira, António see de Sousa da Camara, Emmanuel, Branquinho de Oliveira, António, et Gomes da Luz, Carlos, 128-M.
 Bratley, C. O., 217-M.
 Bratley, C. O. see Rose, Dean H., Bratley, C. O. and Pentzer, W. T., 225-M.
 Braun, 197-M.
 Braun, H. und Riehm, E., 169-M.
 Brédo, H.-J., 12-M.
 Breider, Hans, 61-M, 170-M, 198-M.
 Brejoux, R. see Trouvelot, B., 115-M.
 Brener, W. H., 38-M.
 Breny, R., 38-M.
 Brett, C. C., 61-M.
 Brien, R. M., 126-M.
 Brierley, Philip and Doslitttle, S. P., 218-M.
 Brigg, Fred see Kendrick, James B., 65-M.
 Broadfoot, H., 242-M.
 Brooks, F. A. see Schoonover, Warren R., Brook, F. A. and Walker, H. B., 68-M, 225-M.
 Brown, Arthur C. see Newell, Wilmon, 112-M.
 Brown, C., 170-M.
 Brown, James M., 126-M.
 Browne, F. G., 218-M.
 Bruch, Carlos, 127-M.
 Brudnaia, A. A., 243-M.
 Bruneteau, J., 38-M.
 Bruneteau, J. see Bruneteau, L., 107-M.
 Bruneteau, J. et Vimeney, P., 107-M.
 Bruneteau, L. et Bruneteau, J., 107-M.
 Bruno, Albert, 198-M.
 Bua, Gaetano, 243-M.
 Buchanan, L. L., 218-M.
 Buchanan, T. S., 243-M.
 Buchanan, W. D. see Wolfenbarger, D. O., 23-M.
 Buckhurst, A. S. see Gimmingham, C. T., 151-M.
 Buddin, Walter, 198-M.
 Bulger, J. W. and Nelson, O. A., 107-M.
 Bunting, B., 12-M.
 Burk, Earl F. see Jones, Leon K., Vincent, C. L. and Burk, Earl F., 247-M.
 Bushnell Ralph J. see Lund, Horace O., 111-M.
 Busnel, R.-G. et Chevalier, M., 86-M.
 Butac, Filomeno L. see Otanes, Faustino Q., 132-M.
 Buzicky, Albert see Shepard, Harold H., 226-M.
 Bynum, E. K., Haley, W. E. and Charpentier, L. J., 148-M.
 Bynum, E. K. see Ingram, J. W., Bynum, E. K. and Douglas, W. A., 153-M.
 CABRINI, ELISA see BALDACCI ELIO, 37-M.
 Cairaschi, E.-A., 107-M, 127-M.
 Cairns, D. see Poole, A. L., 67-M.
 Cairns, H. and Muskett, A. E., 62-M.
 Calderón, S., 105-M.
 Caldwell, N. E. H., 108-M.
 Calinisan, Melanio R., 62-M.
 Calinisan, Melanio R. see Palo, Macario A., 133-M.
 Calvino, Mario, 170-M.
 Camp, A. F. and Fudge, B. R., 148-M.
 Campbell, A. V., 126-M.
 Campbell, W. A., 127-M.
 Campbell, W. A. and Davidson, Ross W., 243-M.
 Candelori, A., 218-M.
 Carimini, M., 243-M.
 Candioli, Primo, 12-M.
 Canzanelli, Arnaldo, 86-M.

- Cardini, Alberto F., 38-M.
 Carn, K. G., 243-M.
 Carneiro, João Gonçalves et Pickel, D. Bento, 170-M.
 Carrick, Robert, 127-M.
 Carroll, J., 243-M.
 Carta, S., 127.
 Carter, R. H., 86-M.
 Cartwright, O. L., 218-M.
 Cartwright, W. B. see Packard, C. M., 175-M.
 Carvalho, J. see Silberschmidt, K., 68-M.
 Casati, Sergio, 87-M.
 Cassab, Antoine, 148-M.
 Cassidy, John F. and Smith, Edwin, 87-M.
 Castellani, Ettore e Ciccarone, Antonio, 107-M.
 Castillo, Bernardo S. and Celino, Martin S., 198-M.
 Cavallini, F. see Poggi, G., 15-M.
 Cayeux, I. see Chouard, Pierre. Durivault, G., Lécolier, P., Trouillon et Cayeux, L., 140-M.
 Celino, M. S. see Ocfemia, G. O., 155-M.
 Celino, Martin S. see Castillo, Bernardo S., 198-M.
 Cervi, B., 148-M.
 Chaboussou, F., 87-M, 107-M, 170-M.
 Chabrolin, Ch., 87-M.
 Chabrolin, Ch. et Montlaur, L., 87-M.
 Chamberlain, E. E., 62-M, 148-M, 198-M, 243-M.
 Chamberlain, E. E. and Baylis, G. T. S., 148-M.
 Chamberlain, R., 243-M.
 Chamberlin, F. S. see Morgan, A. C., 224-M.
 Chappaz, Georges, 38-M.
 Chardenon, J., 87-M.
 Charles, Vera C., 218-M.
 Charrin, Victor, 13-M.
 Charpentier, L. J. see Bynum, E. K., Haley, W. E. and Charpentier, L. J., 148-M.
 Charpentier, L. J. see Ingram, J. W., Haley, W. E. and Charpentier, L. J., 153-M.
 Chatterjee, P. N., 197-M.
 Chatterjee, S. N. see Beeson, C. F. C., 198-M.
 Chaudhuri, H., 107-M.
 Chauvin, R., 107-M, 218-M.
 Chesnokov, P. G., 149-M.
 Chester, K. Starr and Janison, Clyde, 108-M.
 Chevalier, M. see Busnel, R.G., 86-M.
 Chiappelli, R., 218-M.
 Chiarugi, Alberto, 170-M.
 Chiesa Molinari, O., 62-M, 170-M.
 Childs, James F. L., 198-M.
 Chiu, Shin Foon, 218-M.
 Chizzali, F., 13-M.
 Chorin, M., 87-M.
 Chouard, P[ierre], Durivault, G., Lécolier, P., Trouillon et Cayeux, L., 149-M.
 Choussy, Félix, 87-M.
 Chowdhury, S., 149-M.
 Christian, M. B. see Oterberger, B. A., 155-M.
 Christoff, Alexander, 198-M.
 Christoff, Michail, 170-M.
 Chrzaszcz, Tadeusz und Kasznica, Jan, 38-M.
 Ciccarone, Antonio, 108-M.
 Ciccarone, Antonio see Castellani, Ettore, 107-M.
 Ciferri, R[affaele], 13-M, 198-M, 218-M, 243-M.
 Ciferri, Raffaele e Baldrati, Isaia, 127-M.
 Ciferri, Raffaele e Gaddini, Leopoldo, 243-M.
 Ciferri, Raffaele see Pollacci, Gino, Ciferri, Raffaele e Gallotti, Mario, 44-M.
 Clark, Charles A., 87-M.
 Clarke, G. H., 62-M.
 Claus, Arnold, 62-M.
 Clausen, Curtis P., 140-M.
 Clausen, R., 62-M.
 Clayton, C. N. see Keitt, G. W., 91-M.
 Clemente, G., 127-M.
 Clouston, T. W. see Knight, R. L., 65-M.
 Cochran, L. C. see Smith, Clayton O., 19-M.
 Cockerham, George, 62-M.
 College of Agriculture, University of the Philippines, 218-M.
 Collins, C. W., 198-M.
 Compere, Harold, 149-M.
 Connors, I. L. see Beall, Geoffrey, Stirrett, Geo. M. and Connors, I. L., 12-M, 61-M.

- Cook, Melville Thurston, 13-M.
 Cooley, J. S. and Davidson, Ross W., 219-M.
 Cooper, E. R. see Tiller, L. W., 207-M.
 Corradini, Paola, 198-M.
 Cortes, P. Raul, 243-M.
 Corti, Hercules, 39-M.
 Cory, E. N. see Ditman, L. P., Cory, E. N. and Graham, Castillo, 88-M
 Cory, Ernest see Graham, Castillo, 89-M.
 Cosolo, Sergio, 87-M.
 Costa, A. S. e Do Amaral, Julio Franco, 149-M.
 Costa, A. S. e Forster, R., 149-M.
 Costa, A. S. e Fraga, júnior, C. G., 149-M.
 Costantino, Giorgio, 170-M, 198-M.
 Cottier, W., 62-M, 108-M, 170-M.
 Cottier, W. and Clark, P. J., 170-M.
 Couturier, A., 88-M, 170-M.
 Cox, James, A., 88-M.
 Clark, P. J. see Cottier, W., 170-M.
 Crafts, A. S., 39-M, 62-M, 87-M.
 Crafts, A. S. and Rosenfels, R. S., 62-M.
 Crafts, A. S. see Rosenfels, R. S., 67-M.
 Cralley, E. M., 219-M.
 Creighton, John T., 219-M.
 Creuzburg, U., 13-M.
 Cristinzio, M. see Trotter, Alessandro, 228-M.
 Crosier, Willard, 219-M.
 Crosier, Willard and Patrick, Stewart, 39-M.
 Cumley, R. W. and Goldsmith, G. W., 219-M.
 Cummins, George B., 219-M.
 Cummins, J. E., 108-M.
 Cunningham, H. S. and Wessels, P. H., 219-M.
 Curtis, K. M., 199-M.
 Cutright, C. R., 219-M.
 DA COSTA LIMA, A., 199-M, 219-M.
 Dameron, W. H. and Smith, P. H., 149-M.
 D'Angelo, Wilfrido A., 39-M.
 Da Fonseca, J. Pinto, 62-M.
 Dastur, Jehangir Fardunji, 127-M, 199-M.
 Dauberschmidt, Karl, see Hofmann, Christoph, 172-M.
 Davidson, Ross W. see Campbell, W. A., 243-M.
 Davidson, Ross W. see Cooley, J. S., 219-M.
 Davis, W. C., Young, George Y., and Orr, Leslie W., 243-M.
 Davis, William C. and Latham, Dennis H., 108-M.
 De Bach, Paul, 108-M.
 De Barros Rodriguez Queiroz, Jorge, 219-M.
 De Biezanko, Ceslau Maria e De Freitas, Ramão Gomes, 219-M.
 De Bruyn, Helena L. G., 170-M.
 Decoux, I. et Simon, M., 149-M.
 Decker, G. C. see Travis, Bernard V., 115-M.
 De Fluiter, H. J., 39-M, 108-M, 127-M.
 De Freitas, Ramão Gomes see De Biezanko, Ceslau Maria, 219-M.
 De Garcia Cabral, Raul Vasco, 13-M.
 de Haan, I., 127-M.
 de Lapparent, Pierre, 88-M, 127-M.
 de Lapparent, P., 170-M.
 De Lapparent, P. see Feytaud, Jean, 128-M.
 del Cañizo, José, 243-M., 244-M.
 Delgado de Torres, Demetrio, 244-M.
 Della Beffa, Giuseppe, 108-M.
 Dell'Angelo, G. G., 39-M, 88-M.
 de Lourdes d'Oliveira, Maria, 13-M, 39-M, 219-M.
 De Marchi, I. see Verona, O., 116-M.
 Dennis, R. W. G., 62-M.
 Department of Agriculture, Mysore State, 62-M.
 Department of Horticulture and Illinois State Natural History Survey, 244-M.
 de Peralta, F. and Agati, J. A., 62-M.
 de Peralta, Fernando see Agati, J. A., 241-M.
 De-Rege, F. see Borasio, L., 107-M.
 Desai, M. H. see Garthwaite, P. F., 200-M
 Desai, M. K. see Uppal, B. N., 69-M.
 Desaymard, P., 128-M.
 Deschiens, Robert see Roubaud, Emile, 68-M.
 Deshusses Jean see Deshusses Louis, 170-M.
 Deshusses, Louis et Deshusses, Jean, 170-M.

- De Sornay, P., 219-M.
 de Sousa da Camara, Eminentue, Bran-
 quinho de Oliveira, Antonio Lopes et
 Gomes da Luz, Carlos, 128-M.
 De Sousa da Camara, Emmanuele et
 Gomes da Luz, Carlos, 39-M.
 Dey, P. K. and Singh, U. B., 244-M.
 Diachun, Stephen, see Johnson, E. M.,
 Diachun, Stephen and Vallean, W. D.,
 201-M.
 Diachun, Stephen see Vallean W. D.,
 Diachun, Stephen and Johnson, E. M.,
 96-M.
 Dias, S. J. F., 128-M.
 Diaz de Mendivil, José M^a, 171-M.
 Dick, J. see Ripley, L. B., Hepburn,
 G. A., Petty, B. K. and Dick, J., 133-M.
 Dické, F. F., 219-M.
 Dicker, G. H. L., 62-M.
 Diehl, R., 171-M.
 Dieter, C. E. and Wilson, H. F., 149-M.
 Dillon Weston, W. A. R., 63-M., 128-M.
 Di Pinto, V., 149-M.
 Di Stefano, Gaetano, 219-M.
 Ditman, L. P., Cory, E. N. and Graham,
 Castillo, 88-M.
 Do Amaral, Julio Franco see Costa, A.
 S., 149-M.
 Dobreanu, E. see Manolache, C., Do-
 breanu, E. et Manolache, Fl., 111-M.
 Dobrohele, J. F., 244-M.
 Dobrohele, F. F. see Shevelev, I. N.,
 206-M.
 Doidge, E. M. and Turner, F. A., 128-M.
 d'Oliveira, Branquinho, 39-M, 244-M.
 D'Oliveira, Maria de Lourdes, 244-M.
 Dominguez, Francisco see Benlloch [Mar-
 tinez], Miguel, 242-M.
 Dominick, C. B., 88-M.
 Donà, A., 220-M.
 Doolittle, S. P., Beecher, F. S. and Porte,
 W. S., 108-M.
 Dopp, Ernest see Rands, R. D., 156-M.
 Doslittle, S. P. see Brierley, Philip,
 218-M.
 Douglas, W. A. see Ingram, J. W., By-
 num, E. K. and Douglas, W. A., 153-M.
 Dowden, Philip B., 39-M, 108-M.
 Downes, W., 220-M.
 Drake, Carl J. and Frick, D. M., 150-M.
 Drayton, F. L. see Growes, J. W., 64-M.
 Drechsler, Charles, 63-M, 128-M.
 Drees, 171-M.
 Drummond-Gonçalves, Raul, 220-M.
 Duarte, A. J., 39-M.
 Dufrenoy, J., 171-M.
 Dufrenoy, J., Reed, H. S. et Sempio,
 C., 171-M.
 Dufrenoy, J. et Valatz, 128-M.
 Dugas, A. L., 150-M.
 Duggar, B. M. see Locke, S. B., Riker,
 A. J. and Duggar, B. M., 174-M.
 Dulzetto, Filippo e Muscatello, Giuseppe,
 220-M.
 Dumbleton, L. J., 244-M.
 Dundas, B. and Scott, G. W., 88-M.
 Dunegan, John C., 199-M.
 Du Perron, H. W., 128-M.
 du Plessis, S. J., 150-M.
 Durivault, G., see Chouard, Pierre, Du-
 rivault, G., Lécolier, P., Trouillon et
 Cayeux, L., 149-M.
 du Toit, E. and Phillips, E. P., 63-M.
 du Toit, Roscar see Phillips, E. J., Har-
 ding, J. J. and du Toit, Roscar, 67-M.
 Dykstra, T. P., 108-M, 199-M, 244-M.
 ECKSTEIN, KARL, 39-M.
 Eddins, A. H., 150-M, 220-M.
 Eddy, C. O., 150-M.
 Edgerton, C. W., 108-M.
 Egorova, I. I., 199-M.
 Ehrenhardt, H., 88-M.
 Ehrlich, John, 88-M., 199-M.
 Eichinger, 63-M.
 Eichler, Wolfdietrich, 63-M.
 Ejercito, Juan, 63-M.
 El-Helaly, A. F., 63-M, 244-M.
 Elisei, Flavio Giuseppe, 39-M.
 Elliott, Charlotte and Poos, F. W., 244-M.
 Ellis, Don E., 108-M.
 Ellisor, L. O., 108-M.
 Ellisor, L. O. and Floyd, E. H., 220-M.
 Ellisor, L. O. and Ingram, J. W., 150-M.
 Elsookov, M. P., 199-M.
 English, L. S., 88-M.
 Erler, E., 128-M, 220-M.
 Ermolaev, M. F., 245-M.
 Escherich, K., 88-M.
 Essig, E. O., 220-M.
 Evans, J. W., 245-M.

- Evenden, James C. and Gibson, A. L., 245-M.
 Evlakhova, A. A., 199-M.
 Ewans, J. W., 128-M.
 Ewing, H. E., 39-M.
 Ext, Warner, 40-M, 199-M.
- FAES, HENRI, 63-M, 150-M, 220-M.
 Fahey, J. E. see Steiner, L. F., 19-M.
 Fahey, Jack E., Rusk, Harold W., Steiner, Loren E. and Sazama, R. F., 109-M.
 Falkenstein, B. J., 171-M, 199-M.
 Farrar, M. D., 109-M.
 Favard, Paul G., 128-M.
 Favilli, R. see Lucchetti, G., 111-M.
 Fawcett, H. S., 63-M.
 Fawcett, H. S. and Klotz, L. J., 88-M.
 Fawcett, H. S. and Rhoads, A. S., 88-M.
 Fédération des Associations Agricoles et Viticoles de l'Arrondissement de Mâcon, 109-M.
 Fedotova, T. I., 199-M.
 Fedotova, T. I. and Kasperovitch, Z. S., 199-M.
 Fennah, R. G., 245-M.
 Fenton, F. A., 200-M.
 Ferdinandsen, C. og Jørgensen, C. A., 150-M.
 Fernández, F. J., 150-M.
 Feytaud, Jean, 88-M, 109-M, 128-M, 171-M.
 Feytaud, Jean et de Lapparent, P., 128-M.
 Ficht, G. A. and Hinton, T. E., 89-M.
 Fichtner, G., 40-M.
 Fife, L., 150-M.
 Fikry, Amin, 220-M, 245-M.
 F. I. P. A. [Fédération internationale de la Presse Agricole], 109-M.
 Fischer, George W., 220-M.
 Fischer, Hermann, 40-M, 109-M.
 Fischer, R. see Unverdorben, O., 47-M.
 Fish, S., 171-M.
 Fisher, Charles K. see Barnes, Dwight F., Fisher, Charles K. and Kaloostian, George H., 217-M.
 Fisher, D. F. see Miller, Erston V., Winston, J. R. and Fisher, D. F., 224-M.
 Flachs, K., 128-M.
 Flachs, K. und Walter, M., 63-M.
 Flanders, S. E., 220-M.
 Flint, W. P. see Bigger, J. H., 86-M.
 Flor, H. H., 245-M.
 Floyd, E. H. see Ellisor, L. O., 220-M.
 Foerster, H., 109-M.
 Fonseca, J. Pinto da, 150-M.
 Fonseca, J. Pinto da e Araujo, R. L., 151-M.
 Forbes, I. L., 151-M.
 Forster, R. see Costa, A. S., 149-M.
 Foresi, Elio, 89-M.
 Foscolo, Em. et Lefèvre, P.-C., 151-M.
 Fox, Henry, 89-M.
 Fraga júnior, C. G. see Costa, A. S., 149-M.
 Frampton, Vernon L., 220-M.
 Francis, W. D., 128-M.
 Franco, Coaracy M. see Mendes, Luiz O. T., 132-M.
 François, Louis, 245-M.
 Francolini, F., 245-M.
 Frank, A., 245-M.
 Franz, Host, 220-M.
 Franz, Jost, 89-M.
 Frappa, Claudius, 89-M.
 Frear, Donald E. H. see Thurston, H. S. Jr., 115-M.
 Frick, D. M. see Drake, Carl J., 150-M.
 Frickhinger, H. W., 109-M.
 Fritz, Roy see Wilbur, Donald A., 135-M.
 Froggatt, John L., 128-M, 129-M.
 Frömming, E., 63-M.
 Fudge, B. R. see Camp, A. F., 148-M.
 Fullaway, D. T. see Swezey, O. H., Fullaway, D. T., Mason, A. C. Holdaway, F. G. and Sakimura, K., 158-M.
 Fusignani, Jader, 89-M.
 GÄBLER, HELLMUTH, 63-M, 129-M.
 Gabotto, Luigi, 151-M, 171-M.
 Gadd, C. H., 63-M, 245-M.
 Gaddini, Leopoldo see Ciferri, Raffaele, 243-M.
 Gaines, J. C., 220-M.
 Gaines, R. C., 220-M.
 Gaines, R. C. see Smith, G. L., Scales, A. L., and Gaines, R. C., 226-M.
 Galachian, R. M., 151-M.
 Gallego, F. L., 200-M.

- Gallotti, Mario see Pollacci, Gino, Ci-
ferri, Raffaele e Gallotti, Mario, 44-M.
Gamboli, A., 151-M.
Garbowski, L., 40-M.
Garcés, O. Carlos, 200-M.
Garcia, Catalino, E., 129-M.
García Rada, German, 245-M.
Gardner, C. A., 171-M, 200-M.
Garino-Canina, Ettore, 89-M.
Garlough, F. E., 151-M.
Garman, Philip and Townsend, J. F.,
171-M.
Garmendia, Juan Ortiz, 63-M, 151-M,
245-M.
Garoglio, Pier Giovanni, 171-M.
Garren, Kenneth H., 63-M.
Garrett, S. D., 246-M.
Garthwaite, P. F. and Desai, M. H.,
200-M.
Garthwaite, P. F., 220-M.
Gassner, Gustav, 151-M.
Gaudineau, M., Raucourt, M. et Morel,
G., 109-M.
Gäumann, Ernst, 129-M.
Gehlsen, C. A., 129-M.
Geisler, A., 40-M.
Geisthardt, G., 40-M.
Georgescu, Const. C. și Badea, M., 221-M.
Georgi, C. D. V., Lucy, A. B., and Teik,
Gunn, Lay, 63-M.
Georgi, C. D. V. and Teik, Gunn Lay,
129-M, 221-M.
Gerbaldi, Costanzo, 40-M.
Ghidini, Gian Maria, 13-M, 109-M, 246-M.
Ghillini, Carlo Alberto, 40-M, 246-M.
Gibbs, J. G., 63-M.
Gibson, A. L. see Evenden, James C.,
245-M.
Gigante, Roberto, 109-M, 172-M, 246-M.
Gilliatt, F. C., 64-M.
Gilmer, Paul M., 221-M.
Gimingham, C. T. and Buckhurst, A. S.,
151-M.
Ginai, M. Asghar, 129-M, 246-M.
Gingrich, N. S. see Vinson, C. G., Mc-
Reynolds, D. K. and Gingrich, N. S.,
69-M.
Gini Lacorte, Carlos, 40-M.
Ginsburg, Joseph M., 221-M.
Ginsburg, J. M., and Perlgut, L. E.,
110-M.
Gioelli, F., 129-M.
Glasscock, H. H. see Ware, W. M.,
48-M, 64-M.
Glöckner, Günther, 246-M.
Goddard, Mary, 64-M.
Godfrey, G. H., 200-M.
Goffart, H., 129-M, 172-M.
Goidànich, Athos, 172-M, 221-M, 246-M.
Goidànich, Gabriele, 13-M, 40-M, 89-M,
110-M, 221-M, 246-M.
Goidànich, G[abriele] et Azzaroli, F.,
40-M.
Goldsmith, G. W. see Cumley, R. W.,
219-M.
Golitzin, S. V. et Levina, R. E., 200-M.
Gomes, Jalmirez G. e Reiniger, Carlos
Henrique, 151-M.
Gomes, Jalmirez G. see Reiniger, G. H.,
251-M.
Gomes da Luz, Carlo, 129-M.
Gomes da Luz, Carlos see De Sousa
da Camara, Emmanuele, 39-M.
Gomes da Luz, Carlos see de Sousa da
Camara, Emmanuele, Branquinho de
Oliveira, Antonio et Gomes da Luz,
128-M.
Gómez Clemente, Federico, 246-M.
Gómez Clemente, Federico y González
Regueral, Francisco, 246-M.
Gómez-Menor, Juan, 110-M, 211-M.
Gómez Menor y Ortega, Juan, 13-M.
Gonçalves da Silva, S. A., 129-M.
Gonçalves, Cincinnato Rory e Reiniger,
Carlos Enrique, 151-M.
Gontaev, A. F., 246-M.
Gonzales, Salustiano S., 129-M.
González de Andrés, Carlos, 246-M.
González Regueral, Francisco see Gó-
mez Clemente, Federico, 246-M.
Goodding, L. N. see Long, W. H., 248-M.
Goodey, T., 151-M.
Goodhue, L. D., and Haller, H. L.,
221-M.
Gorlenko, M. V., 172-M.
Goss, Robert W., 221-M.
Gösswald, Karl, 151-M.
Goto, K., 172-M.
Götz, Bruno, 64-M, 129-M.
Gough, H. C., 64-M.
Gould, George E., 89-M.
Graham, Castillo and Cory, Ernest, 89-M.

- Graham, Castillo see Ditman, L. P., Cory, E. N. and Graham, Castillo, 88-M.
- Grandori, Luigia see Grandori, Remo, 89-M.
- Grandori, Remo, 89-M.
- Grandori, Remo e Grandori, Luigia, 89-M.
- Grassé, Pierre P., 40-M.
- Gratia, A. et Manil, P., 13-M.
- Grebennikov, S. D., 151-M.
- Greeves, T. N. and Muskett, A. E., 64-M.
- Gregory, P. H., 40-M.
- Greis, Hans, 89-M.
- Grieve, D. J., 64-M.
- Griffith, A. L. see Rangaswami, Rao Sahibs, 225-M.
- Grillo, Heitor V. Silveira, 152-M.
- Grisson, P., 89-M, 172-M.
- Grove, A., 152-M.
- Growes, J. W. and Drayton, F. L., 64-M.
- Grunberg, A., 152-M.
- Guffroy, Ch., 13-M.
- Guba, E. F., 221-M.
- Gupta, R. L. see Rao, Y. Ramchandra, 250-M.
- Gutiérrez, Herminio P., 200-M.
- Guyot, A. L., 152-M.
- Guzzini, Dario, 110-M.
- HAASIS, FRANK A., 89-M.
- Hadert, Hans, 13-M.
- Hahn, Glenn Gardner, 110-M.
- Haley, W. E. see Bynum, E. K., Haley, W. E., and Charpentier, L. J., 148-M.
- Haley, W. E. see Ingram, J. W., Haley, W. E. and Charpentier, L. J., 153-M.
- Haley, W. E. see Mathes, Ralph, Ingram, J. W. and Haley, W. E., 155-M.
- Hall, Arthur, 247-M.
- Haller, H. L. see Goodhue, L. D., 221-M.
- Hambleton, E. J., 200-M.
- Hamilton, D. W. and Steiner, L. F., 221-M.
- Hampe, P., 222-M.
- Hanf, M., 89-M.
- Hanna, A. D., 152-M, 247-M.
- Harding, J. J. see Phillips, E. J., Harding, J. J. and du Toit, Roscar, 67-M.
- Hargreaves, H., 90-M.
- Harrington, Cecil D. and Searls, Ed. M., 222-M.
- Harrison, A. L., 200-M.
- Harrison, A. L. see Horsfall, James G., 41-M.
- Hart, Helen and Allison, J. Lewis, 110-M.
- Hart, Helen und Becker, Hauna, 90-M.
- Hartzell, Albert see Imle, E. P., 41-M.
- Hartzell, Albert and McKenna, George F., 200-M.
- Hartzell, Albert and Wilcoxon, Franck, 90-M, 200-M.
- Hartzell, Albert see Wilcoxon, Frank, Hartzell, Albert and Wilcoxon, Fredericka, 228-M.
- Hase, A., 64-M, 172-M.
- Hassebrauk, K., 152-M.
- Hastings, Ellsworth B. and Pepper, J. H., 222-M.
- Hastings, R. J., Bosher, J. E. and Newton, William, 129-M.
- Hattori, T. and Tamura, T., 172-M.
- Hausen, H. N. and Thomas, H., 222-M.
- Hawker, Lillian E., 64-M.
- Hayward, Kenneth J., 247-M.
- Headlee, Thomas J. and Jobbins, D., 110-M.
- Hedgcock, George G., 110-M.
- Heim, Roger et Bouriquet, G., 40-M.
- Heinrich, Carl, 90-M.
- Heinze, K., 129-M.
- Heinze K., see Kahler, E., 65-M.
- Heinze, K. and Profft, J., 90-M.
- Hellinger, Esther see Reichert, I., 16-M.
- Hemmi, Takewo, 222-M.
- Hemmi, Takewo and Akai, Shigeyasu, 172-M.
- Hemmi, Takewo and Imura, Junzo, 222-M.
- Hemmi, Takewo and Konishi, Sentaro, 222-M.
- Hendrickx, Fred L., 247-M.
- Henrick, J. O., 129-M.
- Hepburn, G. A. see Ripley, L. B., 67-M.
- Hepburn, G. A. see Ripley, L. B., Hepburn, G. A. Petty, B. K. and Dick, J., 133-M.
- Hepting, George H., 172-M.
- Herfs, Adolf, 130-M.
- Hering, E. M. see Jordan, K., 41-M, 173-M.

- Herrick, J. Arthur, 247-M.
Herrmann, R. und Kretzdorn, H., 40-M.
Herviaux see Vincent, Boisshot et Herviaux, 116-M.
Hienton, T. E. see Ficht, G. A., 89-M.
High, M. M., 172-M.
Hilborn, M. T. and Linder, David H., 64-M.
Hildebrand, A. A., 64-M.
Hill, C. C., Pinckney, J. S. and Udine, E. J., 152-M.
Hill, H. H. see Jenkins, A. E., Polhamus, Loren and Hill, H. H., 110-M.
Hill, R. P., 172-M.
Hilmy, A. L. see Shafik, Mohamed, Amer, A. and Hilmy, A. L., 157-M.
Hirt, Ray R., 130-M.
Hoffmann, Clarence, 222-M.
Hoffmann, W., 41-M.
Hofmann, Christoph, 90-M, 247-M.
Hofmann, Christoph und Dauberschmidt, Karl, 172-M.
Hogan, T. W. see Johnston, C. J. R., 130-M.
Holdaway, F. G. see Swezey, O. H., Fullaway, B. T., Mason, A. C., Holdaway, F. G. and Sakimura, K., 158-M.
Holloway, T. E., 152-M.
Hood, Clifford E., 222-M.
Hopkins, J. C. F., 14-M, 247-M.
Höricht, 130-M.
Horrenberger, R. see Sergeant, Edmond, Parrot, L., Horrenberger, R., 157-M.
Horsfall, James G. and Harrison, A. L., 41-M.
Horsfall, J. L. see Thomas, C. A., 227-M.
Horticultural Branch, 130-M.
Hosny, M. see Beshir, M., 242-M.
Houins, Franz, 14-M.
Hovy, J. W. H., 172-M.
Howe, E. W. see Tenhet, J. N., 46-M.
Hrisafi, Cornelia P., 201-M.
Huber, Glenn A. see Schwartz, C. D., 18-M.
Hudault, E. et Zelensky, V., 41-M.
Hughes, C. G., 152-M.
Hull, R., 64-M.
Hulpoi, Aurelia, 152-M.
Hulpoi, Aurelia see Sandu-Ville, C., 157-M.
Humphrey, Norman, 90-M.
Hungerford, H. B., 90-M.
Hurst, R. R. see Ayers, G. W., 241-M.
Husmann, Frederik L. see Husmann, George C., Snyder, Elmer and Husmann, Frederik L., 152-M.
Husmann, George C., Snyder, Elmer and Husmann, Frederick L., 152-M.
Husni, Mahmoud see Shafik, Mohamed, 157-M.
Hussein, M., 41-M.
Hutson, J. C., 172-M.
Hyde, E. O. C. see Neill, J. C., 44-M, 132-M.
Hynes, H. J., 130-M.
Hynes, H. J. and Wilson, R. D., 173-M.
IBATULINA, F. S., 173-M.
Ikeda, Y. see Tasugi, H., 20-M.
Imle, E. P. and Hartzell, Albert, 41-M.
Imperial Institute. Consultative Committee on Insecticide Materials of Vegetable Origin, 14-M., 90-M, 130-M.
Imura, Junzo see Hemmi, Takewo, 222-M.
Ing, Ernest G., 153-M.
Ing, Ernest G. and Small, Thomas, 153-M.
Ingram, J. W., Bynum, E. K. and Douglas, W. A., 153-M.
Ingram, J. W. see Ellisor, L. O., 150-M.
Ingram, J. W., Haley, W. E. and Charpentier, L. J., 153-M.
Ingram, J. W., Jaynes, H. A. and Lobdell, R. N., 153-M.
Ingram, J. W. see Mathes, Ralph, Ingram, J. W. and Haley, W. E., 155-M.
Institut International d'Agriculture, 153-M.
Isely, Dwight, 222-M.
Ivanoff, S. S. see Wiant, James S., Ivanoff, S. S. and Stevenson, John A., 22-M.
JACKSON, L. W. R., 222-M.
Jagger, Ivan, C., 201-M.
Jahnel, Helmut, 64-M.
Jamison, Clyde see Chester, K. Starr, 108-M.

- Jancke, O., 110-M, 201-M.
Jancke, O. und Nietzsche, G., 110-M.
Janjua, Nazeer Ahmed, 201-M.
Jannone, Giuseppe, 130-M, 173-M, 201-M.
Jary, S. G., 41-M.
Jary, S. G. and Austin, M. D., 41-M.
Jauch, Clotilde, 201-M.
Jaynes, H. A., 153-M.
Jaynes, H. A. see Ingram, J. W., Jaynes, H. A. and Lobdell, R. N., 153-M.
Jefferson, R. N. see Bobb, M. L., Woodside, A. M., and Jefferson, R. N., 217-M.
Jeffreys, F. J., 247-M.
Jenkins, Anna E. et Bitancourt, A. A., 201-M.
Jenkins, A. E., Polhamus, Loren G. and Hill, H. H., 110-M.
Jenkins, Anna E. see Bitancourt, A. A., 126-M, 197-M.
Jenkins, Anna E. and Ray, W., 222-M.
Jenkins, Wilbert A., 41-M, 222-M.
Jepson, W. F., 64-M, 247-M.
Jepson, W. F. and Moutia, L. A., 153-M.
Jervis, T. S., 90-M.
Jewett, H. H., 201-M.
Jobbins, D. see Headlee, Thomas J., 110-M.
Joessel, P.-H., 110-M.
Johnson, E. M., Diachun, Stephen and Valleau, W. D., 201-M.
Johnson, E. M. see Valleau, W. D., Diachun, Stephen and Johnson, E. M., 96-M.
Johnson, G. C., 130-M.
Johnson, H. W. see Ayers, T. T., Lefebvre, C. L. and Johnson, H. W., 197-M.
Johnson, James and Ogden, William B., 173-M.
Johnson, J. Peter, 201-M.
Johnson, L. R., 64-M.
Johnson, Thorvaldur, see Newton, Margaret, 249-M.
Jöhnssen, A., 130-M.
Johnston, C. J. R. and Hogan, T. W., 130-M.
Johnston, J. C., 65-M.
Jones, Elmer T., 90-M.
Jones, Fred Reuel, 90-M.
Jones, G., 247-M.
Jones, George D., 14-M.
Jones, Howard A., 91-M.
Jones, H. A., Porter, D. R. and Leach, L. D., 91-M.
Jones, Leon K., Vincent, C. L. and Burk, Earl F., 247-M.
Jones, T. H., 222-M.
Jordan, K. und Hering, E. M., 42-M, 173-M.
Jørgensen, C. A. see Ferdinandsen, C., 150-M.
Jourdan, M. L., 65-M, 91-M.
Judenko, E [ugeniusz], 42-M.
Juncu, Vasile, 173-M.
KAGY, J. F. see BOYCE, A. M., KAGY, J. F., MCCALL, L. G. and LA DUE, J. P., 242-M.
Kalmbach, E. R., 201-M.
Kaloostian, George H. see Barnes Dwight F., Fisher, Charles K. and Kaloostian, George H., 217-M.
Kalshoven, L. G. E., 14-M, 222-M.
Kamenski, S. A. and Mende, V. N., 173-M.
Kamenski, S. A. and Paikin, D. M., 201-M.
Kaserer, Hermann, 65-M.
Kasperovitch, Z. S. see Fedotova, T. I., 199-M.
Kassab, A., 223-M.
Kassanis, Basilios, 65-M.
Kaston, G. J., 173-M.
Kasznica, Jan see Chrzaszcz, Tadeusz, 38-M.
Kaufmann, Otto, 65-M, 91-M, 110-M, 130-M.
Kausche, G. A., 130-M.
Kawamura, T., 173-M.
Keitt, G. W., 65-M.
Keitt, G. W. and Clayton, C. N., 91-M.
Kelsall, Arthur, 65-M.
KenKnight, Glenn and Muncie, J. H., 110-M.
Kessler, Wolfgang, 130-M.
Keyworth, W. G., 42-M.
Kendrick, James B., and Brigg, Fred N., 65-M.
Kienholz, J. R., 223-M.
Kiesselbach, T. A. and Lyness, W. E., 247-M.
Kimmey, J. W., 201-M.
King, C. B., 65-M.

- Kirchner, H.-A. see Reinmuth, E., 133-M.
 Kirkpatrick, A. F., 65-M.
 Kiryu, Tomojiro and Okada, Mampachi 153-M.
 Klapp, E., 173-M.
 Klaus, Horst, 223-M.
 Klinkowski, M., 42-M, 131-M.
 Klotz, L. J. see Fawcett, H. S., 88-M.
 Klotz, L. J. and Turrell, F. M., 14-M.
 Knight, R. L. and Clouston, T. W., 65-M.
 Koehler, Benjamin, 91-M.
 Köhler, Erich, 14-M, 131-M, 174-M, 202-M.
 Köhler, E. und Heinze, K., 65-M.
 Kojio, Konzo, 110-M.
 Kondo, T. see Takano, S., 158-M.
 Konishi, Sentaro see Hemmi, Takewo 222-M.
 Kordes, H., 131-M.
 Kostoff, Dontcho, 65-M, 153-M.
 Kostritzky, L., 42-M.
 Kotte, W., 131-M.
 Kovachevsky, Iv. Chr., 91-M.
 Kramer, M., 154.
 Kramer, M. A. see Silberschmidt, K., 206-M.
 Kreibohm de la Vega, G. A., 202-M.
 Kretzdorn, H. see Herrmann, R., 40-M
 Krishnaswami, C. S. see Thomas, K. M., 20-M, 227-M.
 Krivodubskaja, N. I. see Meier, A. A., 203-M.
 Krueh, Walther, 174-M.
 Kuryluk, W. see Leszczenko, P., 42-M.
 Kumar, L. S. S., 248-M.
 LA DUE, J. P. see BOYCE, A. M., KAGY, J. F., MCCALL, G. L. and LA DUE, J. P., 242-M.
 La Ferla, Anselmo, 42-M.
 Laffond, P. [et] Seltzer, P., 42-M, 131-M.
 Lafon, Max et Teissier, Georges, 202-M.
 Lal, K. B., 65-M.
 Lamb, C. A., 223-M.
 Lamerson, Paul G. and Parker, Ralph L., 223-M.
 Lanchester, H. P., 223-M.
 Lange, W. H., Jr., 110-M.
 Langenbuch, R., 223-M.
 Lapina, V. F., 174-M.
 Larose, E. et Vanderwalle, R., 154-M.
 Larson, R. H. and Walker, J. C., 248-M.
 Larson, R. H. see Walker, J. C., 228-M.
 Lasaroff, Assen W., 14-M.
 Latham, Dennis H. see Davis, William C., 108-M.
 Lathrop, F. H., 91-M.
 Laurent, Pierre, 131-M.
 Leach, L. D. see Jones, H. A., Porter, D. R. and Leach, L. D., 91-M.
 Leach, R., 65-M.
 Le Beau, Francis J., 154-M.
 Lebedev, F. K., 202-M.
 Le Clerg, E. L., 91-M.
 Lécolier, P., see Chouard, Pierre, Durivault, G., Lécolier, P., Trouillon et Cayeux, L., 149-M.
 Lefebvre, C. L. see Ayers, T. E., Lefebvre, C. L. and Johnson, H. W., 197-M.
 Lefebvre, C. L. and Weimer, J. L., 91-M.
 Lefèvre, P.-C., see Foscolo, Em., 151-M.
 Leishman, E., 174-M.
 Leitzke, B. see Nicolaisen, W. und Witzig, I., 155-M.
 Leitzke, E. see Nicolaisen, W., Seelbach, W. und Leitzke, E., 44-M.
 Lepage, H. S., 131-M, 202-M.
 Lerch, Victor, 65-M, 202-M.
 Lesne, P., 131-M.
 Leszczenko, P., Kuryluk, W., 42-M.
 Leukel, R. W. and Nelson, O. A., 91-M.
 Leutritz, John, Jr., 91-M.
 Leuzinger, Hans, 174-M.
 Lever, R. J. A., 154-M.
 Lever, R. J. A. W., 14-M, 223-M.
 Levina, R. E. see Golitzin, S. V., 200-M.
 Liebermann, José, 91-M.
 Liese, 154-M.
 Lincoln, Ralph, 223-M.
 Lindemuth, Karl, 42-M.
 Linder, David H. see Hilborn, M. T., 64-M.
 Llosa, Teobaldo, 42-M, 65-M.
 Lobdell, R. N. see Ingram, J. W., Jaynes, H. A. and Lobdell, R. N., 153-M.
 Locke, S. B., Riker, A. J. and Duggar, B. M., 174-M.

- Lona, Fausto, 42-M.
 Long, W. H. et Goodding, L. N., 248-M.
 Loos, C. A., 202-M.
 López Cristóbal, Ubaldo, 42-M.
 Loughnane, James B., 14-M.
 Lounsky, J., 42-M, 223-M.
 Lucas, Hilde, 91-M.
 Lucchese, Elio, 15-M.
 Luchetti, G., 110-M, 111-M.
 Luchetti, G. e Favilli, R., 111-M.
 Lucy, A. B. see Georgi, C. D. V., Lucy, A. B., and Teik, Gunn Lay, 63-M.
 Lugan, Jacques, 131-M.
 Lund, Horace O. and Bushnell, Ralph J., 111-M.
 Lundie, A. E., 131-M.
 Lüstner, Gustav, 202-M.
 Luthra, Jai Chand, Sattar, Abdus and Bedi, Kishan Singh, 111-M.
 Luttrell, E. S., 223-M.
 Lynch, P. B., 15-M.
 Lyness, W. E. see Kiesselbach, T. A. 247-M.
- MABRY, JANET E. and WALDON, MARY M., 131-M.
 Macdonald, J. A., 202-M.
 Macfarlane, Christina S., 202-M.
 MacLeod, G. F., 65-M, 248-M.
 Macola, Tulio, 174-M.
 Maercks, H., 91-M.
 Magerstein, Vinc, 66-M.
 Magrou, J., 111-M.
 Maier, Willi, 131-M.
 Malenotti, Ettore, 66-M, 91-M, 174-M, 202-M, 223-M, 248-M.
 Malik, Saied Ahmad see Sattar, Abdus, 17-M.
 Mameli Calvino, Eva, 42-M, 111-M, 174-M.
 Mammen, G., 223-M.
 Mandelson, L. F. and Tommerup, E. C., 248-M.
 Manil, P., 154-M, 174-M.
 Manil, P. see Gratia, A., 13-M.
 Mannheims, B. see Bertram, L., 38-M.
 Manninger, G. Adolf, 174-M.
 Manolache, C., 154-M, 202-M.
 Manolache, C., Dobreanu, E. et Manolache, Fl., 111-M.
- Manolache, Fl. see Manolache, C., Dobreanu, E. et Manolache Fl., 111-M.
 Maranhão, Z. C., 43-M.
 Maranhão, Zilcar, C., 131-M, 154-M.
 Marchal, E[mile], 43-M.
 Marchionatto, Juan B., 43-M, 202-M, 203-M.
 Marie, Victor, 174-M.
 Marin, Ignacio Herrera, 203-M.
 Marini Bettòlo, Giovanni Battista see Borzini, Giovanni, 107-M.
 Markevitch, N. P., 203-M.
 Marloth, Raimund H. and Stofberg, F. J., 15-M, 111-M.
 Marlowe, Ralph H., 154-M.
 Marmo, José Canuto, 131-M.
 Marsais, Paul, 43-M, 174-M.
 Marsais, Paul et Ségat, L., 43-M, 154-M.
 Marsh, R. W., 66-M.
 Marshall, Guy A. K., 248-M.
 Marshall, James, 223-M.
 Martelli, G. M., 15-M, 43-M, 91-M, 131-M.
 Martin, J. P., 154-M.
 Martinez-Zaporta, Moisés, 175-M.
 Masefield, G. B., 92-M.
 Mason, L., 154-M.
 Mason, A. C. see Swezey, O. H., Fullaway, D. T., Mason, A. L., Holdaway, F. G., and Sakimura, K., 158-M.
 Masee, A. M., 131-M.
 Mathes, Ralph, Ingram, J. W. and Haley, W. E., 155-M.
 Matthews, F. D., Reneger, C. A. and Thomas, R. P., 43-M.
 Matsumoto, Takashi, 224-M.
 Matter, Bishara see Attia, Rizk, 241-M.
 Matz, Julius, 155-M.
 Mayné, Raymond, 43-M.
 McCallan, S. E. A. and Wilcoxon, Frank, 203-M.
 McCallan, S. E. see Wilcoxon, Frank, 70-M.
 McCall, G. L. see Boyce, A. M., Kagy, J. F., McCall, G. L. and La Due, J. P., 242-M.
 McCauley, W. E., 111-M.
 McCleery, F. C., 175-M.
 McCulloch, E. C. see St. John, J. L., McCulloch, E. C., Sotola, J. and Todhunter, E. N., 227-M.

- McCulloch, Lucia and Pirone, P. P., 111-M.
 McGarr, R. L., 224-M.
 McIntyre, H. L., 248-M.
 McKay, Robert, 66-M, 131-M.
 McKenna, George F. see Hartzell, Albert, 200-M.
 McKinney, K. B., 224-M.
 McMartin, A., 155-M.
 McNew, George L. and Spencer, Ernest L., 132-M.
 McPhail, M., 224-M.
 McReynolds, D. K. see Vinson, C. G., McReynolds, D. K. and Gingrich, N. S., 69-M.
 Mead, H. W., 66-M.
 Mehl, S., 132-M, 155-M.
 Mehl, Sigbert, 155-M, 175-M.
 Mehta, P. R., 248-M.
 Meier, N. F. 175-M, 203-M.
 Meier, A. A. and Krivodubskaja, N. I., 203-M.
 Mejia, F., 203-M.
 Melis, Antonio, 224-M, 249-M.
 Mende, V. N. see Kamenski, S. A., 173-M.
 Mendes, Luiz O. T., 15-M, 92-M.
 Mendes, Luiz O. T. e Franco, Coaracy M., 132-M.
 Mendizábal, Manuel see Ruiz Castro, Aurelio, 251-M.
 Mendizábal Villalba, Manuel, 249-M.
 Menozzi, Carlo, 92-M, 203-M.
 Méquignon, A., 132-M.
 Metcalfe, G., 249-M.
 Meuli, Lloyd J. see Shirley, Hardy L., 68-M.
 Meyer, A. H., 15-M.
 Meyer, E. see Blunck, H., Meyer, E. u. Neu, W., 61-M.
 Meyer-Hermann, K., 43-M, 155-M.
 Mezzetti, Alberto, 43-M, 111-M.
 Middleton, J. T. see Tompkins, C. M., Ark, P. A., Tucker, C. M. and Middleton, J. T., 47-M.
 Milam, Joe see Scott, L. B., 18-M.
 Miles, L. E., 111-M.
 Miller, Erston V. and Schomer, Harold A., 224-M.
 Miller, Erston V., Winston, J. R. and Fisher D. F., 224-M.
 Miller, N. C. E., 249-M.
 Miller, Paul R., 92-M.
 Mills, H. B. and Pepper, J. H., 224-M.
 Mills, R. W. see Reddick, Donald, 205-M.
 Minkiewicz, St., 203-M.
 Miotto, G., 155-M, 249-M.
 Miram, E. F. see Nefedov, N. I., 92-M.
 Mischenko, L. L., 203-M.
 Mix, A. J., 66-M.
 Mo, Tjoa Tjien, 249-M.
 Moity, Marcel, 66-M.
 Monte, Oscar, 203-M.
 Montemartini, Luigi, 43-M, 111-M.
 Montlaur, L. see Chabrolin, Ch., 87-M.
 Moore, W. C., 15-M, 66-M.
 Moreau, L. et Vinet, E., 112-M.
 Morel, G. see Gaudineau, M., Raucourt, M. et Morel, G., 109-M.
 Moreno Márquez, Victor, 249-M.
 Moretti, Giampaolo, 92-M.
 Morgan, A. C. and Chamberlin, F. S., 224-M.
 Moriyama, Tadamitsu, 112-M.
 Morrison, Harold, 175-M.
 Morstatt, H., 43-M.
 Mostovoj, K., 203-M.
 Mottier, P., 132-M.
 Moutia, L. A. see Jepson, W. F., 153-M.
 Muesebeck, C. F. W., 66-M.
 Muggeridge, J., 132-M, 203-M.
 Mühle, E., 204-M.
 Mujica, Fernando, 112-M.
 Mulford, Furman Lloyd and Weiss, Freeman, 175-M.
 Müller, Albert, 204-M.
 Müller, Fritz P., 112-M, 224-M.
 Müller, Gerhard, 175-M.
 Müller, H. R. A., 132-M.
 Müller, K. O., 175-M.
 Müller-Böhme, Helmut see Schwartz, Martin, 18-M.
 Müller-Stoll, W. R., 132-M, 249-M.
 Münch, E., 224-M.
 Muncie, J. H. and Kenknight, Glenn, 110-M.
 Mundkur, B. B. A., 43-M, 224-M.
 Munger, F. see Siegler, E. H., Munger, F. and Smith, L. E., 226-M.
 Munro, J. W., 43-M.
 Munson, R. G., 66-M.

- Murphy, H. C., 92-M.
Murray, C. W. see Reeves, E. L., Yothers, M. A. and Murray, C. W., 16-M.
Murray, R. K. S., 66-M.
Musbach, F. L. see Walker, J. C., 228-M.
Muscatello, Giuseppe see Dulzetto, Filippo, 220-M.
Muskett, A. E., 249-M.
Muskett, A. E. see Cairns, H., 62-M.
Muskett, A. E. see Greeves, T. N., 64-M.
- NAIDENKO, A. I., 155-M.
Naoumov, N. A., 112-M, 175-M.
Nattrass, R. M., 92-M, 249-M.
Naumova, N. A., 204-M.
Nefedov, N. I., 92-M.
Nefedov, N. I. and Miram, E. F., 92-M.
Neill, J. C., and Hyde, E. O., 44-M, 132-M.
Nel, J. J., 15-M.
Nel, R. I. and Stubbings, W. A. K., 132-M.
Nelson, O. A. see Bulger, J. W., 107-M.
Nelson, O. A. see Leukel, R. W., 91-M.
Nepveu, P., 112-M.
Nettles, W. C., 112-M.
Neu, W. see Blunck, H., Meyer, E. u. Neu, W., 61-M.
Newell, Wilmon and Brown, Arthur C., 112-M.
Newton, Margaret and Johnson, Thorvaldur, 249-M.
Newton, Margaret see Peturson, B., 15-M.
Newton, William see Hastings, R. J.
Bosher, J. E. and Newton, William, 129-M.
Nicolaisen, W., Leitzke, B. und Witzig, I., 155-M.
Nicolaisen, W., Seelbach, W. und Leitzke, E., 440-M.
Nicolas, Gustave, 175-M.
Nicolas, Gustave et Aggéry, Berthe, 66-M, 204-M, 249-M.
Nietzke, G. see Jancke, O., 110-M.
Nigam, L. N., see Pruthi, Hem Singh, 44-M.
Niklas, O-F., 92-M, 204-M.
- Niklas, Otto-Friedrich see Bitter, Bernd, 61-M.
Niklas, Otto-Friedrich, 66-M.
Nitsche, G., 132-M.
Noble, Mary, 66-M.
Noll, A., 67-M, 112-M.
Nonell Comas, Jaime, 249-M.
Novelli, Novello, 112-M.
Nowell, William, 44.
- OCAMPO, J. ALCIDES voir WILLE, JOHANNES, OCAMPO, J. ALCIDES, WEBER-BAUER, AUGUSTO, SCHOFIELD, DANIEL, 23-M.
Ocfemia, G. O., 155-M.
Ocfemia, G. O. and Celino, M. S., 155-M.
Ogawa, Masayuki, 204-M.
Ogden, William B. see Johnson, James, 173-M.
Ogilvie, L., 44-M.
Okada, Mampachi see Kiryu, Tomojiro, 153-M.
Old, A. N., see Benjamin, M. S., 126-M.
Oldham, Chas. H., 15-M.
Orian, G., 155-M.
Orlov, S. P., 204-M.
Orr, Leslie W. see Davis, W. C., Young, George Y. and Orr, Leslie W., 243-M.
Orsenigo, Giuseppe, 44-M.
Ortega, Juan see Gómez Menor, 13-M.
Orth, H., 132-M.
Osterwalder, A., 204-M, 249-M.
Otanés, Faustino Q. and Butac, Filomeno L., 132-M.
Oterberger, B. A. and Christian, M. B., 155-M.
Oulton, J. T., 250-M.
Overholts, L. O., 250-M.
Oxburn, Max R., 112-M.
- PACHECO, H., 67-M.
Packard, C. M. and Cartwright, W. B., 175-M.
Padwick, G. Watts, 67-M, 155-M.
Pady, S. M., 250-M.
Paikin, D. M., see Kamenski, S. A., 201-M.
Paillot, A., 112-M, 113-M, 204-M.
Palo, Macario A. and Calinisan, Melanio R., 133-M.
Parham, B. E. V., 15-M.

- Parisi, Ernesto, 250-M.
Parker, K. G. see Tyler, Leon J., Parker, K. G. and Pope, Seth, 207-M.
Parker, Ralph L. see Lamerson, Paul G., 223-M.
Parkin, E. A. and Phillips, E. W. J., 224-M.
Parr, T. J., 113-M.
Parrot, L. see Sergent, Edmond, Parrot, L., Horrenberger, R., 157-M.
Parsons, F. S., 250-M.
Pascalet, M., 133-M.
Pasinetti, L., 133-M., 175-M.
Passalacqua, Tito, 224-M.
Patay, R., 92-M.
Patay, R. see Poisson, R., 176-M.
Patrick, Stewart see Crosier, Willard, 39-M.
Patterson, M. B., 67-M.
Pawlakos, Jannis, 175-M.
Pearson, G. A., 44-M.
Peglion, Vittorio, 15-M., 204-M.
Pelayo, Juan B., 44-M.
Pemberton, C. E., 156-M.
Penso, Giuseppe, 92-M., 113-M.
Pentzer, W. T. see Bratley, C. O., Rose, Dean H. and Pentzer, W. T., 225-M.
Pepper, J. H. see Hastings, Ellsworth, 222-M.
Pepper, J. H. see Mills, H. B., 224-M.
Percher, G., 175-M.
Perkins, J. F., 250-M.
Perlberger, J., 93-M.
Perlgut, L. E. see Ginsburg, J. M., 110-M.
Perotti, Renato, 113-M., 175-M.
Perry, John C., 113-M.
Persing, C. O. see Boyce, A. M., 107-M.
Pescott, R. T. M., 133-M., 176-M.
Petch, C. E., 67-M.
Peterson, R. F., 204-M.
Pétersons, L., 44-M.
Petit, A., 93-M.
Petrak, F., 44-M.
Petri, Lionello, 44-M., 175-M., 250-M.
Pettey, F. W., 15-M.
Petty, B. K. see Ripley, L. B., Hepburn, G. A., Petty, B. K. and Dick, J., 133-M.
Peturson, B. and Newton, Margaret, 15-M.
Pfankuch, Edgar, 133-M.
Pfeil, E. see Stapp, C., 226-M.
Phillips, E. J., Harding, J. J. and du Toit, Roscar, 67-M.
Phillips, E. P., 44-M.
Phillips, E. P. see du Toit, E., 63-M.
Phillips, E. W. J. see Parkin, E. A., 224-M.
Piacco, R., 156-M.
Picard, F. et Balachowsky, A. A., 67-M.
Pickel, B., 67-M., 133-M., 225-M.
Pickel, D. Bento see Carneiro, João Gonçalves, 170-M.
Pickles, Alan, 250-M.
Pieglar, Hanns, 176-M.
Pinckney, J. S. see Hill, C. C., Pinckney, J. S. and Udine, F. J., 152-M.
Pirone, P. P., see McCulloch, Lucia, 111-M.
Pirovano, Alberto, 133-M.
Planes García, Silverio, 250-M.
Plantenziektenkundige Dienst, 93-M.
Pochon, Jacques, 133-M.
Poggi, G. e Cavallini, F., 15-M.
Pohjakallio, Onni, 156-M.
Poisson, Raymond, 204-M.
Poisson, R. et Patay, R., 176-M.
Polhamus, Loren G. see Jenkins, A. E., Polhamus, Loren and Hill, H. H., 110-M.
Poliakov, I. J., 204-M.
Poliakov, J. M., 204-M.
Pollacci, Gino, Ciferri, Raffaele e Gallotti, Mario, 44-M.
Pontis, Rafael E., 225-M.
Poole, A. L. and Cairns, D., 67-M.
Poos, F. W., 225-M.
Poos, F. W. see Elliott, Charlotte, 244-M.
Pope, Seth see Tyler, Leon J., Parker, K. G. and Pope, Seth, 207-M.
Popov, D. V., 205-M.
Popov, P. V., 250-M.
Porte, W. S. see Doolittle S. P., Beecher, F. S. and Porte, W. S., 108-M.
Porter, D. R. see Jones, H. A., Porter, D. R., and Leach, L. D., 91-M.
Porter, R. H., 44-M.
Pospelov, V. P., 176-M., 205-M.
Potts, S. F., 93-M.
Powell, A. K., 67-M.

- Prashad, B., 44-M.
 Preti, Giacomo, 45-M.
 Prévost, Bénédicte, 176-M.
 Price, W. C., 93-M, 202-M.
 Priesner, H., 156-M.
 Profft, J., 93-M.
 Profft, J. see Heinze, K., 90-M.
 Provaglio, G., 176-M, 250-M.
 Provasoli, Luigi, 93-M.
 Provasoli Luigi e Ursone, Giuseppe, 93-M.
 Pruthi, Hem Singh and Baha, H. N., 16-M.
 Pruthi, Hem Singh and Nigam, L. N., 44-M.
 Pruthi, Hem Singh and Samuel, C. K., 16-M.
 Pryor, Dean E. and Walker, J. C., 16-M.
 Pstross, Friedrich, 176-M.
 Pugsley, A. T., 67-M, 133-M.
 Pussard, R., 93-M.
 Puster, R., 67-M.
 Pustet, A., 45-M.
- QUANJER, H. M., 176-M, 177-M.
 Querijero, A. F. see Roldan, E. F., 45-M.
 Questel, D. D. see Baker, W. A., 85-M.
- RADOSLAWOFF, AL., 16-M.
 Rada, Germán García, 156-M.
 Raeder, J. N., 113-M.
 Rafique, Mohammad see Vasudeva, R. Sahai, 21-M.
 Rainwater, C. F., 113-M.
 Rainwater, C. F. and Allen, Norman, 93-M.
 Ramirez, Innocencio, 250-M.
 Raña, Eduardo Antonio, 156-M.
 Rands, R. D. and Abbott, E. V., 156-M.
 Rands, R. D. and Dopp, Ernest, 156-M.
 Rangaswami, Rao Sahib S. and Griffith, A. L., 225-M.
 Ranky, Sándor et Sántha, László, 177-M.
 Rao, Y. Ramchandra and Gupta, R. L., 250-M.
 Ratcliffe, F. N. and Cummins, J. E., 177-M.
 Raucourt, M., 113-M.
- Raucourt, M. see Gaudineau, M., Raucourt, M. et Morel, G., 109-M.
 Rawlins, T. E. and Tompkins, C. M., 225-M.
 Rawlins, W. A., 225-M.
 Ray, W. see Jenkins, Anna E., 222-M.
 Rea, H. E., 225-M.
 Reddick, D., 45-M.
 Reddick, Donald and Mills, W. R., 205-M.
 Reed, H. S. see Dufrénoy, J., Reed, H. S., et Sempio, C., 171-M.
 Reeves, E. L., Yothers, M. A. and Murray, C. W., 16-M.
 Régnier, Robert, 93-M, 113-M.
 Reichert, I. and Avizohar, Zehara, 93-M.
 Reichert, I. und Hellinger, Esther, 16-M.
 Reiff, Francisc see Vasiliu, V. V., 228-M.
 Reiniger, Carlos Enrique see Gomes, Jalmírez G., 151-M.
 Reiniger, Carlos Enrique see Gonçalves, Cincinnato Rory, 151-M.
 Reiniger, Carlos see Silveira, Verlande Duarte, 157-M.
 Reiniger, G. H. e Gomes, Jalmírez G., 251-M.
 Reinmuth, E. u. Kirchner, H.-A., 133-M.
 Remiszewski, T., 16-M.
 Rensberg, Ruth E., 225-M.
 Reneger, C. A. see Matthews, E. D., Reneger, C. A. and Thomas, R. P., 43-M.
 República Argentina. Ministerio de Agricultura de la Nación, 113-M.
 Reyes, Gaudencio M., 133-M.
 Rhoads, Arthur S., 251-M.
 Rhoads, A. S. see Fawcett, H. S., 88-M.
 Richter, H., 16-M, 133-M.
 Riehm, E., 177-M.
 Riehm, E. see Appel, O., 168-M.
 Riehm, E. see Braun, H., 169-M.
 Rieman, G. H. see Allen, T. C., 106-M.
 Riggert, E., 93-M.
 Riker, A. J. and Baldwin, I. L., 93-M.
 Riker, A. J. see Locke, S. B., Riker, A. J. and Duggar, B. M., 174-M.
 Ripley, L. B. and Hepburn, G. A., 67-M.
 Ripley, L. B., Hepburn, G. A., Petty, B. K. and Dick, J., 133-M.
 Ritcher, P. O., 177-M.
 Rivera, Vincenzo, 156-M, 177-M.

- Rivnay, E., 134-M, 225-M.
 Roach, W. A., 16-M.
 Roberti, Domenico, 45-M.
 Robertson, D., 45-M.
 Robertson, Phyllis L., 67-M.
 Robertson, W. C., 156-M.
 Röder, K., 94-M.
 Röder, K. see Schultz, H., 134-M.
 Rodrigues, Celso, 205-M.
 Rodríguez Casals, Carlos, 251-M.
 Rodríguez Sardiña, Juan, 251-M.
 Rogers, C. H., 45-M.
 Rohrbach, Fritz, 177-M.
 Roland, G., 177-M, 205-M.
 Roldan, E. F. and Querijero, A. F., 45-M.
 Romeo, Antonino, 45-M.
 Romney, V. E., 16-M.
 Roos, K., 17-M.
 Roots, Walter, 177-M.
 Rose, Dean H., Bratley, C. O. and Pentzer, W. T., 225-M.
 Rosella, Etienne, 17-M, 45-M, 134-M.
 Rosenbaum, H., 45-M.
 Rosenfeld, Arthur H., 156-M.
 Rosenfels, R. S. and Crafts, A. S., 67-M.
 Rosenfels, R. S. see Crafts, A. S., 62-M.
 Rotman, Aminadav, 67-M.
 Rouart, Stany, 45-M.
 Roubaud, Emile et Deschiens, Robert, 68-M.
 Roy, M. H., 45-M.
 Rozendaal, A., 17-M.
 Ruggieri, Gaetano, 251-M.
 Rui, Dino, 94-M.
 Ruiz Castro, Aurelio, 251-M.
 Ruiz Castro, Aurelio y Mendizábal, Manuel, 251-M.
 Rungs, Ch., 45-M.
 Rusk, Harold W. see Fahey, Jack E., Rusk, Harold W., Steiner, Loren E. and Sazama, R. F., 109-M.
 Russell, R. C., 177-M.
 Russo, Giuseppe, 17-M, 94-M, 156-M.
 Ryker, T. C., 157-M.
 Sakimura, K. see Swezey, O. H., Fullaway, D. T., Mason, A. C., Holdaway, F. G. and Sakimura, K., 158-M.
 Sala, Giovanni, 205-M.
 Salaman, Redcliffe N. and Wortley, W. R. S., 251-M.
 Salazar, Clery G., 17-M.
 Sampson, Kathleen, 45-M.
 Samuel, C. K. see Pruthi, Hem Singh, 16-M.
 Sanderson, Milton W., 94-M.
 Sandu-Ville, C. și Hulpoi, Aurelio, 157-M, 205-M.
 Sanford, G. B., 225-M.
 Sanson, J., 17-M.
 Santarelli, M., 45-M.
 Sántha, László see Ranky, Sandor, 177-M.
 Sasscer, E. R., 157-M.
 Sattar, Abdus and Malik, Saied Ahmad, 17-M.
 Sattar, Abdus see Luthra, Jai Chand, Sattar, Abdus and Bedi, Kishan Singh, 111-M.
 Săvulescu, Tr., 177-M.
 Săvulescu, Tr. și Sandu-Ville, Const., 17-M.
 Sandu-Ville, Const. see Săvulescu, Tr., 17-M.
 Sauer, H. F. G., 205-M.
 Sawada, Kaneyoshi, 17-M, 18-M.
 Sazama, R. F. see Fahey, Jack E., Rusk, Harold W., Steiner, Loren E., and Sazama, R. F., 109-M.
 Scales, A. L. voir Smith, G. L., Scales, A. L. and Gaines, R. C., 226-M.
 Scaramuzza, L. C., 157-M.
 Scarone, F., 134-M.
 Schaal, L. A., 18-M.
 Schad, C. et Soulié, H., 113-M.
 Schaeffler, Herbert, 68-M.
 Schaerffenberg, B., 45-M, 134-M.
 Schaffner, Jr. J. V., 225-M.
 Schaper, Paul, 18-M, 178-M.
 Schedl, Karl E., 46-M.
 Schimitschek, Erwin, 94-M.
 Schlichting, Ilse, 18-M.
 Schlosberg, Morris and Baker, W. A., 94-M.
 Schmidt, Martin, 113-M.
 Schneider-Orelli, O., 68-M.

SABUROVA, P. V., 205-M.
 Sachtleben, Hans, 94-M, 177-M.
 Sadasivan, T. S., 17-M, 68-M.
 Sakimura, K., 157-M, 225-M.

- Schofield, Daniel see Wille, Johannes E.,
Ocampo, J. Alcides, Wéberbauer, Augusto, Schofield, Daniel, 23-M.
Schomer, Harold A., see Miller, Erston V., 224-M.
Schoonover, Warren R., Brooks, F. A., and Walker, H. B., 68-M, 225-M.
Schrepfer, E., 251-M.
Schropp, W. und Arenz, B., 94-M.
Schultheiss, 113-M.
Schultheiss, Fritz, 251-M.
Schultz, Enrique F., 205-M.
Schultz, H., 94-M, 114-M, 251-M.
Schultz, H. und Röder, K., 134-M.
Schwartz, Martin und Müller-Böhme, Helmut, 18-M.
Schwartz, C. D. and Huber, Glenn A., 18-M.
Schwerdtfeger, F., 114-M.
Scott, Eunice I., 68-M.
Scott, G. W. see Dundas, B., 88-M.
Scott, L. B. and Milam, Joe, 18-M.
Scott, R. C., 134-M.
Searls, Ed. M. see Harrington, Cecil D., 222-M.
Seaver, J. F. and Waterston, J. M., 225-M.
Seelbach, W. see Nicolaisen, W., Seelbach, W. und Leitzke, E., 44-M.
Seeliger, R., 157-M.
Segal, L. see Marsais, Paul, 43-M, 154-M.
Sélariès, P., 114-M.
Selenkina-Beltyukova, X. N., 94-M.
Sellke, Kurt, 94-M.
Sellke, Kurt und von Winning, Erika, 94-M.
Seltzer, P. see Laffond, P., 42-M, 131-M.
Semenov, A. E., 157-M, 251-M.
Sempio, Cesare, 18-M, 114-M, 178-M.
Sempio, C. see Dufrénoy, J., Reed H. S., et Sempio, C., 171-M.
Sergeant, Edmond, Parrot, L., Horrenberger, R., 157-M.
Servazzi, Ottone, 114-M.
Shaffer, M. L., 157-M.
Shafik, M., 46-M.
Shafik, Mohamed, 157-M.
Shafik, Mohamed, Amer, A. and Hilmy, A. L., 157-M.
Shafik, Mohamed and Husni, Mahmoud, 157-M.
Sharp, S. S., 18-M.
Shchepetilnikova, V. A., 178-M.
Shear, G. M. and Ussey, H. D., 226-M.
Shek, G., 205-M.
Shepard, Harold H., 178-M, 226-M.
Shepard, Harold H. and Buzicky, Albert W., 226-M.
Sherwin, R. A., 134-M.
Shevelev, I. N. and Dobrobleb, I. F., 206-M.
Shirck, F. H., 114-M.
Shirley, Hardy L. and Meuli, Lloyd J., 68-M.
Shottwell, Robert L., 18-M.
Shull, A. Franklin, 206-M.
Sibilia, Cesare, 46-M, 95-M, 114-M, 178-M, 251-M.
Siebenmann, 206-M.
Siegler, E. A. and Bowman, J. J., 252-M.
Siegler, F. H., Munger, F. and Smith, L. E., 226-M.
Siggers, Paul V., 134-M.
Silberschmidt, K. e Carvalho, J., 68-M.
Silberschmidt, K. et Kramer, M., 206-M.
Silberstein, Lazare see Bertrand, Gabriel, 106-M.
Siloret, G., 178-M.
Silva, Pedrito, 178-M.
Silveira, Verlande Duarte e Reiniger, Carlos, 157-M.
Silvestri, Filippo, 18-M, 114-M, 206-M.
Simmonds, J. H., 206-M.
Simmonds, P. M., 19-M, 68-M.
Simon, Jaroslav, 178-M.
Sinon, M. see Decoux, L., 149-M.
Singh, U. B. see Dey, P. K., 244-M.
Skoblo, I. S., 178-M.
Sirri, A., 206-M.
Small, Thomas, 158-M.
Small, Thomas see Ing, Ernest G., 153-M.
Smee, Colin, 46-M, 95-M, 134-M.
Smieton, Margaret J., 226-M.
Smit, C. J. B., 19-M.
Smith, Clayton O., 134-M.
Smith, Clayton O. and Cochran, L. C., 19-M.
Smith, C. O. see Smith, Donald J., 95-M.
Smith, Donald J. and Smith, C. O., 95-M.

- Smyth, E. Graywood, 158-M.
 Smith, Edwin see Cassidy, John F., 87-M.
 Smith, Floyd F., 206-M.
 Smith, G. L., Scales, A. L. and Gaines, R. C., 226-M.
 Smith, H. P. see Dameron, W. H., 149-M.
 Smith, J. Harold, 178-M, 252-M.
 Smith, L. E. see Siegler, E. H., Munger, F., and Smith, L. E., 226-M.
 Smith, Myron W., 95-M.
 Smith, Ralph W., 19-M.
 Smith, Roger C., 226-M.
 Smith, W. P., 178-M, 206-M.
 Snapp, Oliver I., 95-M, 115-M.
 Snyder, Elmer see Husmann, George C., Snyder, Elmer, and Husmann, Frederick L., 152-M.
 Soil Conservation Service, Department of Agriculture, Kenya Colony, 19-M.
 Sonan, Jinhaku, 19-M, 115-M, 206-M.
 Sorenson, Hans, 158-M.
 Sosa, Calisto I., 46-M.
 Sotola, J. see St. John, J. L., McCulloch, E. C., Sotola, J. and Todhunter, E. N., 227-M.
 Soulié, H., 115-M.
 Soulié, H. see Schad, C., 113-M.
 Souty, J., 226-M.
 Souza, Decio, 158-M.
 Soyer, D., 179-M.
 Spaeth, J. Nelson and Afanasiev, M., 46-M.
 Spafford, W. J., 68-M.
 Spencer, Ernest L. see McNew, George L., 132-M.
 Spencer, Herbert, 115-M.
 Speyer, W., 46-M, 68-M, 95-M, 226-M.
 Spoon, W., 46-M.
 Springenguth, W., 68-M.
 Squire, A., 252-M.
 Squire, F. A., 46-M.
 Staehelin, M., 68-M, 115-M, 226-M.
 Stahel, Gerold, 226-M.
 Standen, J. H., 19-M.
 Stapp, C., 206-M.
 Stapp, C. und Pfeil, E., 226-M.
 States Växtskyddsantalt, 226-M, 227-M.
 Station Fédérale d'Essais et de Contrôle des Semences, Lausanne (Mont-Calmé), 179-M.
 Steiner, Hans, 46-M.
 Steiner, H. M. see Worthley, H. N., 24-M.
 Steiner, L. F., 19-M.
 Steiner, L. F. and Fahey, J. E., 19-M.
 Steiner, L. F. see Hamilton, D. W., 221-M.
 Steiner, Loren see Fahey, Jack E., Rusk, Harold W., Steiner, Loren E., and Sazama, R. F., 109-M.
 Steiner, P., 68-M, 134-M, 179-M.
 Stellwaag, F., 95-M, 227-M.
 Stepniewska, Klementyna, 46-M, 206-M.
 Stevenson, G. C., 19-M, 158-M.
 Stevenson, John A. see Wiant, James S., Ivanoff S. S. and Stevenson, John, 22-M.
 Steyaert, R. L., 68-M.
 Stirrett, Geo. M. see Beall, Geoffrey, Stirrett, Geo. M. and Connors, I. L., 12-M, 61-M.
 St. John, J. L., McCulloch, E. C., Sotola, J. and Todhunter, E. N., 227-M.
 Stofberg, F. J. see Marloth, Raimund H., 15-M, 111-M.
 Störmer, 19-M.
 Straib, W., 20-M, 158-M, 179-M.
 Strawinski, Konstanty, 20-M.
 Stubbings, W. A. K., 69-M.
 Stubbings, W. A. K. see Nel, R. I., 132-M.
 Suire, Jean, 115-M.
 Summers, Eaton M., 158-M.
 Swan, D. C., 207-M.
 Swezey, O. H., Fullaway, D. T., Mason, A. C., Holdaway, F. G. and Sakimura, K., 158-M.
 Swingle, M. C., 227-M.
 Sy, M., 20-M, 46-M, 95-M.
 Sydow, H., 134-M.
 Sydow, H. and Ahmed, Sultan, 134-M.
 Syre, H., 20-M, 69-M, 206-M.
 Swain, Ralph B., 69-M.
 Szirmai, János, 179-M.
 Szymański, W., 20-M.
 TAKAHASHI, RYOICHI, 20-M.
 Takahashi, William N., 227-M.
 Takano, S. and Kondo, T., 158-M.
 Tamura, T. see Hattori, T., 172-M.
 Tarassov, V. M., 207-M.

- Tarchi, Angelo, 207-M.
Tasca Bordonaro, Lucio, 134-M.
Tasugi, H. and Ikeda, Y., 20-M.
Tate, H. D. and Vandenberg, S. R., 69-M.
Tavares, Ivan, 20-M.
Tchernishov, P. K., 207-M.
Teik, Gunn Lay see Georgi, C. D. V., 129-M, 221-M.
Teik, Gunn Lay see Georgi, C. D. W., Lucy, A. B. and Teik, Gunn Lay, 63-M.
Teissier, Georges see Lafon, Max, 202-M.
Telenga, N. A., 207-M.
Tenhet, J. N. and Howe, E. W., 46-M.
Thalenhorst, Walter, 46-M, 115-M.
Thiem, H., 47-M, 207-M.
Thirumalachar, M. J., 95-M.
Thomas, C. A. and Horsfall, J. L., 227-M.
Thomas, Eug. A., 46-M.
Thomas, H. see Hansen, H. N., 222-M.
Thomas, H. Earl and Ark, P. A., 227-M.
Thomas, H. Earl see Ark, P. A., 216-M.
Thomas, K. M. and Krishnaswami, C. S., 21-M, 227-M.
Thomas, R. P. see Matthews, E. D., Reneger, C. A. and Thomas, R. P., 43-M.
Thompson, G. E., 69-M.
Thompson, H. S., 227-M.
Thompson, W. L., 227-M.
Thompson, W. R., 20-M, 47-M.
Thung, T. H., 179-M.
Thurston, H. S., Jr. and Frear, Donald E. H., 115-M.
Thurston, Jr. H. W., 227-M.
Tiller, L. W. and Cooper, E. R., 207-M.
Tims, Eugene C., 158-M, 159-M.
Timson, S. D., 21-M.
Tischler, W., 47-M.
Todhunter, E. see St. John, J. L., McCulloch, E. C., Sotola, J. and Todhunter, E. N., 227-M.
Tommerup, E. C. see Mandelson, L. F., 248-M.
Tompkins, C. M., Ark, P. A., Tucker, C. M. and Middleton, J. T., 47-M.
Tompkins, C. M. see Rawlins, T. E., 225-M.
Topi, Mario, 207-M.
Torrle, James H., 159-M.
Toro, Rafael, 159-M.
Tóth, László, 115-M.
Townsend, Charles H. T., 47-M.
Townsend, J. F. see Garman, Philip, 171-M.
Townsend, James F. see Turner, Neely, 179-M.
Tpograt, D. J., 159-M.
Trappmann, W. O., 21-M.
Trappmann, W., 21-M.
Travis, Bernard V., 115-M.
Travis, Bernard V. and Decker, G. C., 115-M.
Trinchieri, Giulio, 47-M, 134-M.
Tropova, A. T., 207-M.
Trotter, Alessandro, 21-M, 95-M, 227-M.
Trotter, Alessandro e Cristinzio, M., 228-M.
Trottet, 47-M.
Trouillon see Chouard, Pierre, Duri-vault, G., Lécolier, P., Trouillon et Cayeux, L., 149-M.
Trouvelot, B., 95-M, 179-M.
Trouvelot, B. et Brejoux, R., 115-M.
Trunov, G. A., 159-M.
Trzebinski, Józef, 21-M.
Tschermak von Seysenegg, Erich, 115-M.
Tucker, B. W. E., 159-M.
Tucker, C. M., 95-M.
Tucker, C. M. see Bohn, G. W., 61-M.
Tucker, C. M. see Tompkins, C. M., Ark, P. A., Tucker, C. M. and Middleton, J. T., 47-M.
Tucker, C. M. see Wiant, James S., 228-M.
Turnbull, J., 69-M.
Turner, F. A. see Doidge, E. M., 128-M.
Turner, Neely, 179-M.
Turner, Neely and Townsend, James F., 179-M.
Turrell, F. M. see Klotz, L. J., 14-M.
Tychanicz, M., 47-M.
Tyler, Leon J., Parker, K. G. and Pope, Seth, 207-M.
UDINE, E. J. see Hill, C. C., Pinckney, J. S. and Udine, E. J., 152-M.
Ullstrup, Arnold J., 95-M.
Ullyett, G. C., 21-M.
Unverdorben, O. und Fischer, R., 47-M.
Uphof, J. C., 69-M, 95-M, 207-M.
Uppal, B. N. and Desai, M. K., 69-M.

Urquijo Landaluce, Pedro, 179-M.
 Ursone, Giuseppe see Provasoli, Luigi,
 93-M.
 Usinger, Robert L., 159-M.
 Ussery, H. D. see Shear, G. M., 226-M.

VALATX see DUFRENOY, J., 128-M.
 Valleau, W. D., Diachun, Stephen and
 Johnson, E. M., 96-M.
 Valleau, W. D. see Johnson, E. M., Dia-
 chun, Stephen and Valleau, W. D.,
 201-M.

Valpassos, Osvaldo, 207-M.
 Vandenberg, S. R. see Tate, H. D., 69-M.
 Vanden Brande, J., 47-M.
 Van den Bruel, W. E., 159-M.
 Van der Laan, P. A., 179-M.
 Vanderwalle, R., 47-M, 179-M.
 Vanderwalle, R. see Larose, E., 154-M.
 Van Koot, Y., 21-M.
 Van Nes, 207-M.

Van Poeteren, N., 179-M.
 Van Schreven, D. A., 21-M, 69-M, 180-M.
 Vanterpool, T. C., 21-M.
 Vasiliev, J. V., 207-M.
 Vasiliu, V. V. și Reiff, Francisc, 228-M.
 Vasiljeski, A. and Zubov, M., 180-M.
 Vasseur, R. E., 207-M.

Vasudeva, R. Sahai and Ashraf, Mohd,
 47-M.
 Vasudeva, R. Sahai and Rafique, Mo-
 hammad, 21-M.
 Vayssière, Paul, 47-M, 69-M, 96-M.
 v. Brandenstein, W. und v. Weiss, H. A.,
 48-M.

Velasco Llanos, Vicente, 69-M.
 Velbinger, Helmut, 116-M.
 Veloso, Ch. Gustavo, 180-M.
 Vengris, Jonas, 207-M.
 Venkatarayan, J. A., 134-M.
 Ventre, Jules, 21-M.
 Verona, O. e De Marchi, I., 116-M.
 Verrall, A. F., 135-M.
 Viado, Getulio B., 69-M.
 Viale, Luigi, 48-M.

Vickery, Joyce W., 180-M.
 Vidal, J.-L., 21-M.
 Viégas, A. P., 69-M, 135-M, 159-M.
 Viennot-Bourgin, G., 48-M, 159-M.
 Viennot-Bourgin, G. see Balachowsky,
 A., 106-M.

Villeneuve de Janti, J., 22-M.
 Vimeney, P. see Bruneteau, J., 107-M.
 Vinas, J[ean], 22-M.
 Vincent, Boischot et Herviaux, 116-M.
 Vincent, C. L. see Jones, Leon K.,
 Vincent, C. L. and Burk, Earl F.,
 247-M.
 Vinet, E. see Moreau, L., 112-M.
 Vinson, C. G., McReynolds, D. K. and
 Gingrich, N. S., 69-M.
 Virgin, Walter J. and Walker, J. C.,
 228-M.

Vittoria, Antonio, 180-M.
 Vivas, Oscar, 180-M.
 Vladimirskaia, M. E., 208-M.
 Volkart, A., 180-M.
 Vollert, H.-E., 22-M, 180-M.
 Volodina, Z. S., 22-M.
 von Finck, Erich, 70-M.
 v. Weiss, H. A. see v. Brandenstein, W.,
 48-M.

von Winning, Erika, 159-M.
 von Winning, Erika see Sellke, Kurt,
 94-M.
 Voskresenskola, A. K., 180-M.
 Voss, J., 180-M.
 Voukassovitch, Pavlé, 180-M.

WAGER, VINCENT, 208-M.
 Wagner, E. C., 70-M.
 Waksman, Selman A., 208-M.
 Walker, Harry G. and Anderson, Lauren
 D., 22-M, 96-M.
 Walker, Harry G. see Anderson Lau-
 ren D., 126.

Walker, H. B. see Schoonover, Warrar
 R., Brooks, F. A. and Walker, H. B.,
 68-M, 225-M.
 Walker, J. C., 160-M.
 Walker, J. C. and Larson, R. H., 228-M.
 Walker, J. C. see Larson, R. H., 248-M.
 Walker, J. C. and Musbach, F. L., 228-M.
 Walker, J. C. see Pryor, Dean E., 16-M.
 Walker, J. C. see Virgin, Walter J.,
 228-M.

Wallace, G. B., 22-M, 96-M.
 Wallace, James M., 22-M.
 Walter, M. see Flachs, K., 63-M.
 Walton, Mary M. see Mabry, Janet E.,
 131-M.
 Ward, Keighley M., 135-M.

- Wardlaw, C. W., 70-M.
 Ware, W. M., 48-M, 64-M.
 Wartenberg, Hans, 228-M.
 Wase, W. M. and Glasscock, H. H., 48-M.
 Watanabe, Tatsuwo, 22-M.
 Waterston, J. M., 96-M, 228-M.
 Waterston, J. M. see Seaver, F. J., 225-M.
 Watkins, Thomas C., 96-M.
 Watzl, Otto, 96-M.
 Wean, Robert E. and Young, J. E., 116-M.
 Weberbauer, Augusto see Wille, Johannes E., Ocampo, J. Alcides, Weberbauer, Augusto, Schofield, Daniel, 23-M.
 Weber, George F., 22-M, 70-M.
 Weber, Teodoro F. A., 48-M.
 Weed Section, Department of Agriculture and Forestry, 70-M.
 Weigert, J., 135-M.
 Weimer, J. I., 228-M.
 Weimer, J. I. see Lefebvre, C. L., 91-M.
 Weiss, Freeman see Mulford, Furman Lloyd, 175-M.
 Wellborn, Vera, 70-M, 116-M, 228-M.
 Wellman, Frederick L., 116-M.
 Wenzl, Hans, 22-M, 70-M, 135-M, 160-M.
 Wessels, P. H. see Cunningham, H. S., 219-M.
 White, C. T., 228-M.
 White, M. J. D., 135-M.
 Whittaker, E. C., 70-M.
 Whitten, R. R. and Baker, W. C., 135-M.
 Wiant, James S., Ivanoff, S. S. and Stevenson, John A., 22-M.
 Wiant, James S. and Tucker, C. M., 228-M.
 Wiehe, P. O., 70-M.
 Wiesmann, R., 22-M, 23-M, 70-M.
 "bur, Donald A. and Fritz, Roy, 15-M.
 oxon, Frank see Hartzell, Albert, M, 200-M.
 xon, Frank, Hartzell, Albert and oxon, Fredericka, 228-M.
 on, Frank see McCallan S. E. A., M.
 n, Franck and McCallan, S. E.,
 1, Fredericka see Wilcoxon, Hartzell, Albert and Wilcoxon, icka, 228-M.
 Wilhelm, A. F., 160-M.
 Wilkins, W. H., 70-M, 71-M.
 Wille, Johannes E., 23-M., 71-M.
 Wille, Johannes E., Ocampo, J. Alcides, Weberbauer, Augusto, Schofield, Daniel, 23-M.
 Williams, W. H., 71-M.
 Williams, W. R. see Askew, H. O., 241-M.
 Williams, W. R. Lloyd, 71-M.
 Williamme, F., 23-M.
 Willis, H. R., 23-M.
 Willison, R. S., 71-M, 180-M.
 Wilson, C. C., 23-M.
 Wilson, G. Fox, 71-M.
 Wilson, H. F. see Dieter, C. E., 149-M.
 Wilson, Malcolm, 71-M.
 Wilson, R. D. see Hynes, H. J., 173-M.
 Winston, J. R. see Miller, Erston V. Winston, J. R., and Fisher, D. F., 224-M.
 Winter, Gerhard, 135-M.
 Witte, Karl, 23-M.
 Wolcott, George N., 71-M.
 Wolf, Fred T. and Wolf, Frederick A., 23-M.
 Wolf, Frederick A., 23-M.
 Wolf, Frederick A. see Wolf, Fred T., 23-M.
 Wolfenbarger, D. O. and Buchanan, W. S., 23-M.
 Wood, F. C., 23-M.
 Woodhead, C. E., 71-M.
 Woodside, A. M. see Bobb, M. L., Woodside, A. M. and Jefferson, R. N., 217-M.
 Worth, C. Brooke, 71-M.
 Worthley, H. N. and Steiner, H. M., 24-M.
 Wortley, W. R. S. see Salaman, Redcliffe, N., 251-M.
 Wright, R. C., 71-M.
 YARWOOD, C. E., 71-M, 135-M.
 Yamasaki, Morimasa and Arikado, Hiroki, 160-M.
 Yothers, M. A. see Reeves, E. L., Yothers M. A. and Murray, C. W., 15-M.
 Young, George J. see Davis, W. C., Young, George Y. and Orr, Leslie W., 243-M.

- | | |
|---|--------------------------------------|
| Young, J. E. see Wean, Robert E., 116-M. | Zelensky, V. see Hudault, E., 41-M. |
| Young, P. A., 135-M. | Zerova, M., 24-M, 71-M. |
| Yu, T. F., 135-M | Zillig, Hermann, 72-M. |
| Yung, V. C., 24-M. | Zimmerman, Elwood, C., 160-M. |
| | Zolotarevsky, B., 24-M. |
| ZACHER, F., 135-M, 136-M. | Zubov, M. F., 160-M. |
| Zade, A., 71-M. | Zubov, M. see Vasiljeski, A., 180-M. |
| Zelensky, V., 24-M. | Żukowski, Julian, 24-M. |
| | Zycha, H., 72-M. |

Prof. Ugo PAPI, *Segretario generale dell'Istituto, Direttore responsabile.*

AGRICULTURAL SCIENCE AND PRACTICE

Indian Agricultural Research Institute (Pusa)
LIBRARY, NEW DELHI-110012

This book can be issued on or before

| Return Date | Return Date |
|-------------|-------------|
| | |